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THE

green scene

HORTICULTURE IN THE DELAWARE VALLEY

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photo by F. Gordon Foster

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Horticulture: Everyone Has a Story

This is our 43rd issue of *Green Scene*; we now begin our eighth volume.

When the Publications Committee began to plan a magazine in 1971, the big question was: will we have enough to fill it? On the average, we publish approximately 70 articles a year, of varying lengths. We have never wanted for material; there are, however, still many untold stories among our members.

Scouting articles on horticultural subjects is done several ways. Often people are modest and have to be persuaded that what they have to share about growing plants is worthwhile. For example, I was told by a landscape architect, whose judgment about these matters is impeccable, that he knew someone who had constructed a remarkable bamboo greenhouse. It took several phone calls to persuade the shy grower-architect that our readers would be very interested in his project. When he finally wrote a most charming article, we had requests from a newspaper and a magazine for information about the man and his work. The pleased author has allowed that at some future date he will probably do another article.

In addition to referrals, occasionally we may pirate a fine writer from another publication. One writer came to us via the *New York Times* Garden Section; he had written a lively, controversial article, and we noticed in the credit line that he was from the Delaware Valley area. His point of view was irreverent, warm, humorous, and he was clearly a lover of plants. Perfect for us.

Some favorite articles have been written by people who have come to us and casually noted "this interesting thing is happening." A couple of examples: one man who was moving to a new house gave his valuable conifer collection over to an arboretum. We were on the spot photographing the enormous move. Someone else organized wildflower rescue parties. Again, we sent a photographer along. The story was picked up by several other publications. There are a dozen stories that have come to us because someone told us about her/his interesting project.

Finally, what moved me to write this editorial celebrating our eighth birthday was that someone who had suffered a horticultural tragedy last winter suggested that she write an article about it so other people could avoid a similar tragedy. Well into the story, she told me that writing the article had transformed the experience for her. The process of sharing the information was becoming a small and satisfying collaboration against the forces of nature. Organizing the story gave her some mastery over reality. It will appear sometime this winter.

There are still many marvelous horticulturists out there who haven't appeared in our pages. For example, one woman long ago said we should have a good piece on cyclamen and helped us to find one; however, she herself hasn't written for us yet. Her mind is a storehouse of fabulous information, and she can write. We know that because we recently saw a lovely piece she wrote for a writing class she attended in her 91st year. Too, I cannot hope ever to know or meet all of the people who are doing interesting things horticulturally in this area. Tell us about them so we can all enjoy and benefit from their experiences.



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Tulipa acuminata

TULIPS WITH ADIFFERENCE

by Bebe Miles



T. pulchella violacea



T. tarda



T. kaufmanniana 'Ancilla'

You know tulips, right? Big gobletshaped flowers on long stems that decorate Delaware Valley gardens in April and May. Oh, wrong, my friends. Or at least only partly correct.

To limit yourself to the traditional tulips like Darwin or Cottage types is to miss at least half of the tulip parade every spring. Without downgrading the beauty of a group of stately Darwin, I want to emphasize that these other tulips have a special charm, an almost elfin quality, all the more

effective because of the odd times many appear.

Some of these "different" tulips are true species, a few are hybrids or selections. Many have star-shaped open flowers that may be tapered rather than globular when closed. Some bear clusters of blossoms. Because of their smaller stature a great many are ideal for rock gardens or for small niches or foregrounds. None has foliage that looks objectionable as it matures. Indeed, most of

them ripen off their leaves quickly and so unobtrusively that no one even notices. As an added bonus some of them at least increase into attractive colonies over the years.

If there is any drawback to their use in the ordinary garden, it is their apparent need for dry summers. Perfect drainage is definitely one of their requirements, but so is a thorough baking during dormancy. A reminder of their Mediterranean origins, I suppose. I no longer plant

TULIPS WITH A DIFFERENCE continued

them in areas where I know I will be doing extensive summer irrigating for any reason.

It must also be admitted that not all species tulips in trade are ready to bloom. How many are collected rather than grown specifically for sale I cannot guess. I have, however, had some that grew for several seasons in my garden before finally blooming, and it is hard not to think that they were underage sizes that eventually matured.

Should you have a choice, I would always place most species tulips in the thinnest soil rather than the best loam. Such a Spartan diet seems to inhibit their propensity to increase by means of stolons. You can figure this is the problem if your planting in its second year produces many single blades of foliage.

Finally, with a single exception, all these species must have full sun until their foliage has matured in late spring. This means not only no tree shade but even no competition from burgeoning perennials. The most diminutive cannot compete with even a lush groundcover.

Perhaps the most treasured are the earliest-blooming. For most of us that means March although towards Wilmington some might well appear in February during an easy winter.

look twice

You might have to look twice to recognize *T. turkestanica*, for it produces sprays of very small starry flowers. They accompany the *Chionodoxa*, and the two genera are particularly lovely if planted together. Seldom more than 10 in. high at maturity. *T. turkestanica* is a long-lasting garden decorative too unless there is an early spell of hot weather. Under more normal circumstances a colony may stay in flower for weeks, folding up its blossoms at dusk and on inclement days. The awakening honey bees revel in its pollen.

Just as early is T. pulchella 'Vio-

lacea' which is sometimes cataloged as 'Violet Queen.' This is a vibrant magenta shade and a real knockout in the early grey days of spring. The single blossoms are definitely globeshaped on strong stems perhaps 6 in. high. Plant them closely to accentuate the splash of color, for it is a rare treat at that time of year.

Sometimes you may come across *T. pulchella* 'Humilis.' It is related to 'Violet Queen,' but hardly as dramatic, being a soft lavender and a much slenderer flower.

Right on the heels of these heralds come the various *kaufmanniana* tulips. Most of these are selections or hybrids, but some catalogs offer the true species, which seems to be the earliest of them all. Stems here are seldom higher than 8 in. The large flowers, while long and tapering

Perhaps the most treasured are the earliest-blooming. For most of us that means March although towards Wilmington some might well appear in February during an easy winter.

when closed, open flat in sunshine. It is easy to understand their nickname of waterlily tulips. As a class these are as permanent a tulip as any you are likely to plant (given the right well-drained location). After the first year, the bulbs may break into smaller ones, so that in subsequent years you will have a patch with blossoms of varying sizes. I find that appealing.

T. kaufmanniana itself is rather dull outside but creamy inside. Some of its hybrids and selections are truly quite striking. 'Stresa,' for example, is bright yellow and red; 'Shakespeare' is a combination of orange and apricot. 'Ancilla' and 'Heart's Delight' are two of the best with pink coloring. As a class the kaufmanniana blooms at the same time as many daffodils, which makes for some truly gorgeous companionate possibilities.

Here I might interject a suggestion

that if you are not acquainted with the *kaufmanniana*, you plan a trip next spring to Lenteboden, the display garden of Charles H. Mueller near New Hope, Pa. Call ahead if you want the optimum dates for these particular tulips although all spring there is something worth seeing at this extraordinary "living catalog." This is surely the most pleasant way to see what bulbs can do for the garden.

favorites

Very high on my list of favorite tulips is *T. tarda* (sometimes called *daystemon*). Over the years this darling has given me the best increase of all the species tulips. My colony literally covers the ground, and it seems to be able to cope with ordinary garden conditions very well. Other tulips may falter after a wet summer, but *T. tarda* continues to prosper. Its clusters of starry yellow and cream flowers are incredibly gay when fully open. Only a few inches high, this tulip fits in anywhere.

For the rock gardener or the person with limited space several other midseason species are especially nice. *T. saxatilis* is a lavender lovely with a bright yellow throat. About 10 in. high, it often bears two blooms per stem. *T. batalinii* is a bright yellow with some orange streaking. Its globes are only about 6 in. high and make a fine display if planted only a few inches apart. *T. kolpakowskiana* is a smallish yellow and red with pretty ruffled foliage.

T. clusiana is widely offered as the candystick or lady tulip. Its pink and white striped flowers are about 12 in. high but still dainty. It has, however, the deplorable propensity to split into many small bulbs which wander afield on stolons and often produce more foliage than flowers. Try it in rocky soil, which may slow down its increase.

Although it has never stayed more than a few years in my gardens, *T. praestans* 'Fusileer' is a bright accent



T. sylvestris



T. praestans 'Fusileer'

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for midseason daffodils. Several scarlet blossoms are borne per stem about a foot tall. I suspect it demands more summer dryness than I have given it.

I mentioned that one tulip will take a little shade. It's T. sylvestris, the socalled wood tulip. Be warned to place it always on the edge of a tree planting where it will get at least some hours of good sunshine. Over the years it will wander widely on stoloniferous roots. The nodding pure yellow flowers are medium-sized on stems often at least 16 in, high, It is a particularly graceful tulip because its stems tend to arch rather than stand stiffly upright. It makes a nice contrast in an informal garden where its gypsy habits do not upset a regular design. Try it with our native Phlox divaricata.

Among other midseason species I enjoy are the orange-flecked *T. acuminata*, a strange spidery shape on 18 in. stems; and *T. chrysantha*, a really tiny yellow and red. *T. marjolettii* is a later yellow with rosy streaking. Its height, however, rather restricts it toward the back of a planting where its informality can blend with other spring flowers.

Two more of these wild tulips are worth mentioning if only for their lateness. *T. persica* is a little-seen jewel, bearing several small flowers per stem in late May. It is yellow with bronze touches and hardly 6 in. tall. Use it to light up the foreground where the other early bulbs are over. *T. sprengeri* is by far the latest tulip although a rarity you will have to search for. On 10 in. stems it bears neat red and yellow flowers in early June here at Doylestown.

Some of these tulips, which come directly from the wild, will do better than others in a particular situation. You must try them to discover which will do what for you. And in the attempt I can guarantee you both beauty and pleasure.

Bebe Miles's latest book Wildflower Perennials for Your Garden, published by Hawthorn, has just been issued in paperback.

T

by Frederic L. Ballard

TALE

One Saturday not long ago, I had finished removing the dried sap from the blades of my clippers (Fig. 1) and touching up the cutting edge on a whetstone (Fig. 2). I displayed them to my horticultural friend (Fig. 3) and asked whether she did not find them to be a pleasing artifact. She said yes.

What I had in mind, of course, was aesthetics—the functional shape, the patina on the handle, and the highlight on the polished blade. What my friend had in mind was quite different. It emerged after breakfast next morning.

"Why don't you write an article?"

"Hunh?"

"For the Green Scene."

"Hunh?"

"About those clippers. You've had them 20 years."

"More than 30."

"You can tell how you clean them and sharpen them. People will be interested."

"Uh - hunh."

My friend, as you have surmised, is the publisher of the *Green Scene*, and I had been so rash as to voice an idea she considered publishable. Hence this essay.

About the clippers, there is not much to be said. They are of conventional design, manufactured in the 1940's out of carbon steel. Like all tools of that material, they need to be wiped dry after every use and lightly sharpened on a fine stone after any prolonged cutting. Given this care, plus an occasional scouring to remove the sap, they will last indefinitely. Their modern descendants, with plastic handles and stainless blades, are even easier to take care of. Rust is not a danger, and the new stainless steels hold an edge considerably longer than carbon.

As for major sharpening, i.e., renewing an edge that has been worn away,



Figure 1. Removing the dried sap from clipper blades with a Brillo pad.



Figure 2. Touching up the cutting blade on a fine whetstone.



Figure 3. The clippers that stimulated this article. Do you find tham a pleasing artifact?

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the only satisfactory method is to take the clippers apart and dress the cutting blade as you would a chisel. The blade has one flat face (the face that works against the other blade) and one beveled face. The sharpness angle, i.e., the angle between the flat face and the beveled face, will probably be about 30° for a carbon steel blade and somewhat less. perhaps 22°, for stainless. The sharpening process is as follows:

- 1. The first step is to note the sharpness angle and the amount of wear, as shown in cross section in diagram I.
- 2. The next step is to restore the sharp edge while maintaining the sharpness angle. You accomplish this by removing the excess metal from the bevel face as shown in diagram 2 (the area to be removed is shaded). You can use a file to remove most of the excess and a coarse whetstone for the rest.

You will know that you have just about accomplished your purpose when a burr develops along the cutting edge. A stroke or two with a fine stone will remove the burr, leaving the edge sharp and smooth.

3. Some people would stop at this point. However, the true afficionado goes one step further and creates a microbevel as shown in diagram 3. This increases the sharpness angle and makes the edge wear longer.

Note that all metal is to be removed from the beveled face: the flat face is never touched by the file or the stone. On a curved blade such as this, it is impossible to maintain a uniform sharpness angle; nor is it necessary. The clippers will work satisfactorily over a wide range of angles.

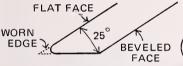
So much for the clippers. I have

offered a bit of information about them because the publisher asked me to, but imparting information about tools is not my real purpose. In point of fact, I am not a tool buff and would not be qualified to discourse on the subject at length. Rather, my aim is to stimulate those who are tool buffs to contribute to future issues of this magazine. The editor assures me that it is not necessary to compose a full length article. She would be delighted with a paragraph or two describing a tool or technique that may not have come to general attention.

By way of example, I present a turntable for grooming bonsai, topiary and other decorative plants. The essential feature is that the turntable can be raised, lowered and revolved to permit easy access to the tops and bottoms of large and small plants. The intriguing feature is the device for adjusting the height.

continued





Cross section of cutting blade showing sharpness angle and wear. The beveled face is at the bottom.

DIAGRAM 2



Same cross section as diagram 1, showing metal to be removed in order to restore cutting angle and edge.

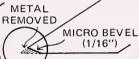


DIAGRAM 3

Closeup cross section of edge showing micro bevel.



Figure 4. Overall view of turntable the green scene • sept. 1979



Figure 5. Turntable at lowest position, for access to the top of the plant.



Figure 6. Turntable at highest position, for access to the bottom of plant.



Figure 7. Closeup showing cross brace (between the legs of the stool at bottom of picture) and pipe clamp to adjust height (under operator's right thumb).

The completed stand is shown in figure 4. The range of heights can be seen in figures 5 (low) and 6 (high). Figure 7 shows how the height is adjusted, which I will explain below.

The materials for the stand consist of a kitchen stool; a piece of wood or plywood about a foot wide; a three-foot length of %-in. pipe, threaded at both ends, a flange and cap to fit the pipe; about three feet of 1 x 2-in. lumber or a piece of ½-in. plywood about 14 in. square; and (the key to the design) a home handyman's furniture clamp consisting of two jaws designed

to be mounted on ¾-in. pipe, one to be screwed on the end of the pipe and the other to slide along it.

To assemble:

- Use the first piece to make the turntable, which is shown as round but could be square, octagonal, etc.
- 2. Use the 1 x 2-in. lumber (or the 14-in. square plywood) to install a cross brace between the legs of the stool 12 in. or 13 in. below the seat.
- 3. Bore holes large enough for the pipe in the center of the seat and

the center of the cross brace.

- 4. Screw the flange in the center of the underside of the turntable.
- Screw one end of the pipe into the flange and pass it through (in order) the sliding jaw of the furniture clamp, the seat, and the cross brace.
- 6. Screw the cap on the other end of the pipe.

To adjust the height, use the thumb of one hand to depress the catch on the clamp (my right thumb in figure 7) and use the other hand to raise or lower the turntable. When you take your thumb off the clamp, it will automatically lock on the pipe at the desired position.

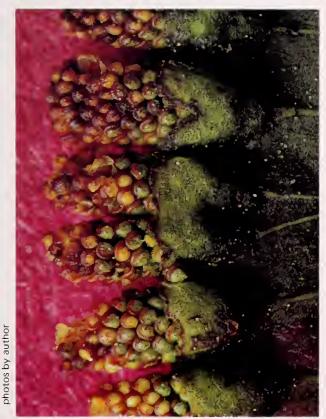
There you have it. Practical, durable, easy to make, and comparatively inexpensive (the clamp costs about \$8.00). A good craftsman could improve the design: three legs instead of four to improve stability; a shorter space between the seat and the cross brace to increase the height range; a drawer for tools; and so forth. You could start with a three-legged sculptor's stand, available in art stores for about \$40.

If you have a better idea for this or any other piece of equipment, don't tell me. Write about it for the *Green Scene* and tell all the gardeners in the Delaware Valley.

Fred Ballard is a lawyer with wide-ranging interests in horticulture. He has written articles for *Green Scene* about the Wissahickon Valley and the aesthetics of pruning. He is also a contributor to the *Bonsai Journal*, published by the American Bonsai Society.



Marattia fraxinea is a large fern of the old world tropics having leaves up to 15 ft. long. Believed from fossil evidence to have had its origin somewhere in the upper Paleazoic or Mesozoic eras, it has retained primitive boat-like spore receptacles mounted on prominent veins.



Well named for its leaf shape, kidney fern, Cardiomanes reniforme, has sporangia in adjacent tubular containers arranged along the periphery of the leaf.



Umbrella fern, *Gleichenia cunninghamii*, known by the Maori as Tapuwee kotuku, is common in New Zealand. Other members of the genus grow in warmer areas throughout the world. It is vinelike in structure and is commonly seen in masses along country roadsides; when dry it can present a serious fire hazard. It does, however, have a most interesting soral pattern. Sporangia, three or more, are arranged to form circular patterns, appearing like cloverleaf biscuits.

FERNS:

THE HIDDEN STORY BENEATH THEIR LEAVES



Beneath the leaves of virtually all ferns there are formations that look like insect egg clusters. This is true whether the fern is a tiny curly-grass fern (Schizaea pusilla) of the New Jersey Pine Barrens, or the giant black tree fern (Cyathea medullaris) of the New Zealand bush. The spore containers and their cluster formations are one of the important features used to identify any one of more than 10,000 of these primitive foliar plants.

Ferns have never developed any colorful flowers, a condition that makes their identification difficult. Having no flowers, it follows that they produce no seeds, and propagation by sexual means is dependent upon the spores.

FERNS: continued





Spores are generated from spore-mother-cells within the walls of the containers or *sporangia*. When each spore-mother-cell matures, it undergoes meiosis, a double division to form four new cells or spores; hence each sporangium will contain some multiple of four spores, such as 48, 64, or 96. Alone, the spores when examined under a microscope are of great value in identifying a fern. Spores vary in size, shape, and color and, in general, are so small that two could be placed side by side on a human hair with room to spare.

Typical shapes of sporangia differ among fern families. Some are spherical, some are egg-shaped, while others have odd and distinctive patterns. Historically, the thickness of sporangial walls is of interest. Ferns originating in the most primitive periods have retained fleshy, multicelled walls. Since rupturing the walls to discharge the spores would be difficult, nature has

provided these sporangia with delicate slits that are forced apart by expanding spores. A good example of this condition is apparent in the grape ferns of the genus *Botrychium*. Sporangial walls of all later ferns are very thin and rupturing is aided by specialized cells.

Some sporangia grow along the edges of the leaflets, like those of the

... two [spores] could be placed side by side on a human hair with room to spare.

cinnamon fern, Osmunda cinnamomea, and are so numerous that the identity of the leaflet is virtually lost. Others, like those of the staghorn ferns of the genus Platycerium, are so closely spaced on the underside of the leaf that the area appears more like a golden-brown wall-to-wall carpet.

While random distribution of sporangia sporangia occurs in some ferns, it is far more common to see clumps or mounds of the sporangia arranged in definite patterns on the underside of the leaves. These orderly arranged mounds are known in the fern language as sori (singular, sorus) a Greek word meaning a "mound" or "heap." A sorus may be composed of three or four sporangia or it may have twenty or more, making a sizable mound.

Sori differ in shape among genera, linear, round, tubular, imbricate, cupor funnel-like being but a few. In some instances the sori are covered with a thin membrane, known as indusium. Where the sorus lacks this protective covering, the fern is said to be naked or exindusiate. A good example of an exindusiate fern is our common rockcap fern, *Polypodium virginianum*. The more than 200 different species of maidenhair ferns growing throughout the world have, in common, leaflets



Left:

Whisk fern, *Psilotum nudum*, grows in many tropical and subtropical areas throughout the world. It is one of our most primitive ferns. Rootless, and with inconspicuous rudimentary leaflets, it has defied evolutionary changes for millions of years.

Right:

Rattlesnake fern, *Botrychium virginianum*, is among the most primitive. Here, thick-walled and stemless spore cases or sporangia are fused to the stalk. Originally spherical, and with equatorial slits, the sporangia have now opened to allow spores to escape through rolled back lips. Occasional white spots are indicative of a few remaining spores.

with reflexed margins serving as indusia.

In addition to the shape of the sorus. the indusium itself carries interesting identification features that can be seen with a magnifying glass. Thus the indusium of the female Athyrium filixfemina has irregular or toothed edges. Little glands appear on the indusium of the intermediate shield-fern, Dryopteris intermedia, separating it from another very similar species. Various members of the genus Woodsia have their indusia coming from beneath the sori. These indusia are streamer-like and as the sporangia increase in size the indusia are often lost to sight, making the fern appear to be exindusiate. Little flaps covering the sporangia of the rosy maindenhair fern, Adiantum hispidulum, are covered with spines that aid in the identification of the species.

The soral distribution pattern on the underside of the leaf is known as the "fertile area." When this area is slightly magnified it is not only fascinating in appearance but as noted before is most helpful in identifying the fern. In some cases this area provides the ultimate in identification; in others it may serve as a positive key and, when combined with additional features, give the final answer.

Ferns like the hay-scented fern, Dennstaedtia punctilobula, have little inverted cups on the underside of its leaves, each filled to the brim with easily seen sporangia. This pattern of the fertile area is the only one of its kind in our northeastern states.

Round sori covered with prominent shield-shaped indusia give a strong clue that the fern is one of our woodland shield ferns, members of the large genus of *Dryopteris*. How the sori are arranged on the leaflet also aids in the final analysis.

Climbing ferns belong to the genus Lygodium and have an unusual soral pattern. As an example, the Japanese climbing fern, *L. japonicum*, has its sporangia covered with imbricate or shingle-like indusia. Beneath each indusium a large egg-shaped sporangium is present.

Filmy ferns grow throughout the world. With leaf tissue only one cell thick, constant moisture is required for their existence. One in particular is Peter's fern, *Trichomanes petersii*, a native of our southern states. This fern has funnel-like containers with the sporangia attached to a central bristle.

These are but a few typical cases. Next time you see a fern turn over its leaves and see if you can interpret its hidden story.

F. Gordon Foster is honorary curator of ferns for Brooklyn Botanic Garden; honorary fern horticulturist for New York Botanical Garden and honorary member of American Fern Society. He won the 1978 PHS Distinguished Achievement Medal. Foster's book Ferns to Know and Grow, published by Hawthorn Books, Inc., NY, was reissued in a second edition in 1976.





Four years ago I moved into a new house; it had no trees or shrubs, much less a lawn. With dreams of a landscape, both lovely and useful, I set out to find plants that produced edible fruit. Realizing that 1/6 acre wasn't enough ground to feed my family, I still wanted to make the land as productive as possible. I also wanted colorful surroundings. So, my goal was to plant a landscape that satisfied three requirements: flowers, fruit, and fall color.

A very hot summer welcomed us to our new house, and we just managed to mow the weeds the builder had left behind. Fall planting ended disastrously. I found that the property was all fill. The original soil level was two to six feet under an assortment of concrete blocks, blacktop, car parts, and a dash of soil. Having discovered that, it's amazing that I tried to grow anything at all.

During the first winter I was enticed by the nursery catalogs I collected. They sold me on plants I had never seen before. After a few trips to the library, I found that reference books supported the catalogs' claims. Four years later I still agree with the catalogs' glowing words about their nursery stock.

However, I was still taking a gamble, for I had never seen an amelanchier, Nanking cherry (*Prunus tomentosa*) or sand cherry (*Prunus besseyi*).

amelanchier

A small, multistemmed tree, the

Amelanchier laevis has several common names. These include shadblow, for the tree blooms when the shad swim up the Delaware River to spawn; serviceberry, for the versatile fruit that is quite delicious; and Juneberry, for the same fruit that ripens in June. Sarvistree is another name found in the nursery catalogs.

The shadblow has several cousins; only a botanist could accurately identify them. *Amelanchier canadensis* is very similar to *A. laevis*, and both species are used in the nursery trade.

A versatile tree, the shadblow can be used several different ways: as a specimen plant, as a hedgerow tree, as a small tree in a woodland setting, and as a small street tree, trained to one trunk.

A native tree, the shadblow can be found in woods throughout the Delaware Valley. In cultivation the tree grows more compactly, just as a cultivated dogwood is better behaved in a landscape than its woodland sister. References state that the shadblow can grow to 25-30 ft. tall. My trees have been growing 1½ to 2 ft. every year.

The bark is light grey and very smooth; it reminds me of steel. Wounds heal slowly: set the tree in a mulched or ground cover bed to prevent lawn mower injury, which could be fatal.

Shadblows are well-suited to grow with other plants, such as periwinkle and daffodils, which surround mine. The tree's white clusters of flowers in April contrast nicely with the blue peri-

winkle blossoms and the yellow daffodils. Since the tree is delicate (thin branches and small leaves), it can be planted against a wall or an evergreen hedge.

Oranges and yellows color the tree in the fall. The small leaves make raking unnecessary. The leaves fall to the ground and disappear into the grass or ground cover.

nanking cherry

My next choice for flower, fruit and fall color was the Nanking cherry (*Prunus tomentosa*). The plants came from a mail-order nursery as small twigs with a few bare roots. One year later the bush was covered with blossoms in April. Two years later I had a row of five-foot, heavily branched shrubs.

Early April blossoms do run the risk of frost damage. Many other stone fruit (peaches, plums, cherries, etc.) are also frequently damaged by a late spring freeze. So far, I've been lucky.

Individual small white flowers cover the stems from ground level to the tip. For 7 to 10 days the Nanking cherry looks like white plumes, growing from the ground. A lovely effect occurs in early evening as the sun catches the blossoms and makes the plants sparkle.

Soon after bloom, the fruits become visible. By harvest in June and July, the small red fruits seem to cling to the branch, without petioles characteristic of other cherries.

Six to eight feet is the final size of the Nanking cherry, with a spread Denise, a neighbor's daughter, with shadblow fruit.



nearly that wide. The fall color is yellow to brown, contributing a warm glow to the hedgerow where they grow.

This bush is also attractive in the winter, as it displays dark, reddish brown stems with small white spots (lenticels). Being very twiggy in growth habit, the bushes will give limited privacy even in winter.

prunus besseyi

The third of the edible trio is *Prunus besseyi*, commonly known as sand cherry or western. The leaves are glossy, with a silvery green hue. The Nanking cherry has a larger, more oval leaf, with serrated edges. This bush is quite similar to the Nanking cherry, except for three traits.

- The sand cherry reaches a smaller height at maturity and is a less vigorous grower. Four to five feet will be its final size.
- By blooming two to three weeks later, the sand cherry is a much more reliable plant for fruiting.
- Finally, I have found the fruit to be quite sour (although Hortus notes it's sweet). It cannot be eaten off the bush without adding sugar. The Nanking cherry has a tart flavor, but at full ripeness, the fruit does have a mild sweetness.

Some extras of the Nanking and sand cherry include their ability to tolerate wet feet. The sand and Nanking cherries form a hedgerow in my rear yard. This area is at the original grade continued

photos by author



Amelanchier blooming in April.



Blossoms of the Nanking cherry



Nanking cherry

15



Prunus besseyi, sand cherry

and is subject to excess water that requires two days to drain. The shrubs do not seem to mind this at all.

The hedgerow also receives northwest winds from an open playing field. Yet, the sand cherry and Nanking bloom every spring, both being listed as hardy plants.

Considered together, the Nanking and sand cherry are at their best as a hedge. Since they will not get very large, pruning will not be necessary. Plant more than one of each type, for pollination and fruit set will be improved. Because the Nanking and sand cherry bloom at different times, they will not pollinate each other. These plants do prefer full sun, unlike the shadblow, which does well in partial shade.

pests and diseases

Some insects do enjoy eating these plants. A local infestation of bagworms plagues me yearly. Japanese beetles also enjoy the leaves. An occasional spray in late June and July with malathion or carbaryl (Sevin) will control the insects. After an application of the milky spore disease to my lawn two years ago, it seems that there are fewer Japanese beetles attacking the plants. Another biological control of these insects would be hand picking.

Tip borers cause the branch tips to die. All I do is prune below the borer and discard the clippings.

A fungus disease, brown rot, can infect the cherries. Wet, humid springs

encourage this disease common to all stone fruit. Weekly sprays with captan or benomyl fungicides will help control brown rot. Brown rot causes the fruit to turn brown, and this disease can quickly destroy all the fruit just before harvest.

soil preparation

Another problem of these plants was the proper preparation of the soil for planting. As each hole was dug with a pickax, no quantity of soil was removed, just rocks, blacktop, cement, and bricks. Extra large and deep holes were carved out of the ground, and purchased topsoil refilled the holes. A handful of bone meal was added to each hole. I didn't use much peat moss or other organic matter, because I feared that the mixture of soil and peat moss would settle too much.

Some of the plants were not planted in generous holes, for I became lazy at the day's end. So far, the shrubs planted in the best prepared holes have grown much better than the others.

The gamble of planting unfamiliar plants in poor soil has paid off very well. All of them, the shadblow, the Nanking and the sand cherries, bear delicious fruit.

There's another plus. Because of the edible fruit, wildlife are attracted to the plants. Always plant an extra tree or bush, so the birds can enjoy their share of delicious fruit.

Cherry Juice from the Nanking Cherry

Wash and crush. Simmer cherries until soft. Strain through cotton flannel, jelly bag, or four layers of cheese cloth. Twist the two ends of the bag to extract more juice.

According to taste, add one to two cups of sugar to each gallon of juice. The juice must be refrigerated, and can keep for a few weeks before using.

I have also used a juice extractor, which is similar to a double boiler, but there are three sections. As the fruit is steam heated, the juice is released from the fruit. The juice then flows out of a tube at the bottom of the top pan. Because juice extractors differ according to brand, follow the manufacturer's directions.

Cherry Syrup for use on pancakes, ice cream, etc.

Follow the above directions, but use equal amounts of sugar to amount of fruit heated. Makes a very sweet and thin syrup.

Shadblow Fruit Pie

Since the fruit has very small seeds, it can be treated as blueberries.

- 4 cups fruit
- 1 cup sugar
- 4 tablespoons flour
- 1/8 teaspoon salt
- 1½ tablespoons lemon juice
- 1 recipe plain pastry, double crust

Mix berries with sugar, flour, salt and lemon juice. Line a 9-in. pie pan with pastry. Pour in filling and cover with top crust. Bake at 450°F for 10 minutes, then reduce temperature to 350°F and bake 20 to 30 minutes longer.

Diane Katzaman is a former county agent of the cooperative extension service in Bucks County. She is now a graduate student at the Wharton School of the University of Pennsylvania. She plans to continue gardening as a hobby.



eastern Asia and South America. Decaisnea, Stauntonia, Holboellia, Parvatia and Akebia are indigenous to the Far East, while Boquila and Lardizabala

are natives of Chile.

photos supplied by author

Figure 1, Akebia guinata

the green scene • sept. 1979

Although most of the members of this family come from the warmer parts of the world and would scarcely be expected to withstand the rigors of our Philadelphia winters, two genera and three species have proved hardy with us and are the subjects of the

Akebia. A genus of deciduous or semi-evergreen climbing or twining shrubs with palmately compound leaves. It contains two species, both native to eastern Asia, and was first described by Joseph Decaisne who took its name from the Japanese vernacular "akebi."

The flowers in Akebia are unisexual, but the plants are said to be monoecious, with the female (carpellate) at the base and the male (staminate) at the ends of the axillary racemes. There are no petals, but the elliptic, slightly fragrant sepals are rosy-purple in the female flowers and purplish-brown in the males ones. The fruit is an oblong, flattened pod which contains several rows of blackish seeds embedded in a somewhat viscous matrix.

A. quinata. This species, by far the commoner of the two, is a vigorous climber with leaves palmately divided into five oblong leaflets (Fig. 1). Rehder (Manual of Cultivated Trees and Shrubs, ed. 2) states that this plant was introduced (probably into Europe) in 1845, that it has fragrant darkcolored flowers in the spring (Fig. 2),

Lardizabala continued

Figure 2. The dark colored flowers of Akebia quinata





Figure 4. Akebia trifoliata leaflets



Figure 3. Seeds - Akebia quinata

but that the showy fruits are rarely produced in cultivation.

Many years ago the late Laura L. Barnes gave us a plant of this species. We set it out at the base of a sweet-gum (*Liquidambar styraciflua*) on our home lawn. It grew rapidly and soon

Akebia quinata has become well established at several places in the valley of the Wissahickon Creek and one can only hope that it never rivals Lonicera japonica as a suffocating weed.

was lost to sight high up in the crown of the "host" tree. We knew it was there, however, because every spring the ground beneath the tree would be covered with the brownish male perianth segments. Then, one day, in September, 1962, we were amazed to find on the ground three somewhat flattened purse-like pods. These, when opened, were found to contain numerous seeds embedded in a sticky mass which reminded us of frog spawn (Fig. 3). Never again has our plant produced fruit.





Figure 6. Fruit of Decaisnea fargesii

Figure 5. Decaisnea fargesii

The tendency of *A. quinata* to become an aggressive weed has long been recognized. At the arboretum we have to keep pruning it severely to prevent it from completely taking over our small vine collection. It has become well established at several places in the valley of the Wissahickon Creek and one can only hope that it never rivals *Lonicera japonica* as a suffocating weed.

A. trifoliata. In sharp contrast to the preceding, this species has leaves that are three-parted, the leaflets often sinuately margined (Fig. 4). It is apparently far less common in cultivation than A. quinata, and we had reached the conclusion that it is less hardy. Rehder says, "Probably tenderer." We were therefore delighted when, in the summer of 1977, Dorothy Bemis brought us a specimen, saying that it was rampant over her garage in a nearby suburb. Elizabeth Farley, the propagator at the Arboretum, has successfully rooted material of this species and it now occupies a place beside its congener in our vine collection.

All of our efforts to pollinate these

two species have met with failure, but we shall continue in the attempt.

Decaisnea. This genus is represented by two species in the Himalayas and western China. Unlike Akebia, it is a shrub with pinnately compound leaves. Its flowers also are strikingly different (Fig. 5), both genera are apetalous, but whereas the sepals of Akebia are elliptic and purplish, those of Decaisnea are lanceolate and greenish-yellów.

Our plant is *D. fargesii*, obtained from the Kingsville Nurseries, Kingsville, Maryland, in 1968. It is a robust specimen, at least 2 m. (6 ft.) tall, which flowers and fruits abundantly.

Most reference works state that this genus is polygamous, that is, a single plant may bear both unisexual and bisexual flowers. There is not the slightest doubt concerning the self-perpetuating nature of our specimen.

Some authors say that the fruit in this genus is a fleshy follicle (Fig. 6). Now, a follicle is usually defined as a dry dehiscent fruit which splits only along one suture. A familiar example is the pod of the common milkweed

(Asclepias). To the best of our knowledge the fruits of the Arboretum's specimen never split, but remain on the plant until far into December, at which time they fall to the ground where presumably, the fruit-coat rots away, releasing the numerous brown, flattish seeds. It would seem that such authors as L. H. Bailey (Manual of Cultivated Plants, ed. 2) are more correct in regarding this fruit as a berry.

These observations have been prepared to call the attention of growers in the Delaware Valley to the features of several unusual plants that should be better known and more widely grown. One word of warning: If you decide to introduce *Akebia quinata* into your garden, please give it plenty of room.

John M. Fogg, Jr., is emeritus professor of botany at the University of Pennsylvania where he taught for over 40 years. He served as director of the University's Morris Arboretum from 1954 to 1966 and in 1966 became director of the Arboretum of the Barnes Foundation.



Stepping stones from the wild make this path through the Crosby rock garden.

getting to the garden path By Alexander L. Crosby

My childhood dream was to build and operate a railroad. Lacking the land, capital, and expertise for fulfillment, I became absorbed in a cheap substitute: building paths. I am still at it, and shall continue as long as I have a hoe and a No. 2 shovel. Our 35 acres in Bucks County are full of opportunities, but much can be done on a suburban lot.

A path should be a means of access and an invitation. It should move people, not suffer them to snore over the Sunday paper. The moving won't be easy unless the path is easy. In public gardens, paths are built with asphalt (an abomination, but it works), bricks, gravel, cinders, stone chips, and wood chips, often with a foundation comparable to that for an interstate highway.

The homeowner has more choices, and they are usually cheaper. Grass is a happy solution for the perennial garden. Old bricks set in sand make a handsome path, but there will always be some trouble with weeds and with heaving from frost. Wood chips are excellent. They could be had for the asking a few years ago, when the Asplundh crews were looking for nearby dumping sites.

So many gardeners are now looking for wood chips that a \$20 bill is useful in establishing priority.

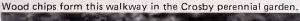
Our perennial garden has only four straight paths, totaling some 110 ft. They are bordered with treated 4 x 4's that were guaranteed to outlast me. We raised the beds by excavating 6 in. of topsoil (the best on our land) from the pathways, which were then filled with wood chips. Although we have added fresh chips each year, decay below has made a good nursery for seedling weeds and trees. The next job

will be to remove all of the chips to a compost pile and put in fresh ones.

Paths through fields and woods are the most interesting. The walker sees more when he is not pushing his way through goldenrod, brush, and other obstacles. Our main path crosses 100 yards of a swampy area to Hickon Creek, where we like to take our lunch in September and enjoy the cardinal flower. Building this path required some 50 wheelbarrow loads of clay and ordinary dirt, hauled by two of the neighborhood boys. (The dirt had

been piled nearby when a backhoe operator dug a ditch to divert a woodland stream to our pond.) At first the dirt fill was so soft that the deer punched holes in it, but gradually the path was hoof-packed.

To provide for drainage, we installed short lengths of 4-in, pipe beneath the path at several points. The choice of pipe was a mistake; the small pipes easily clog with leaves and twigs, and water from heavy rains or melting snow then washes over the path. Some day the pipes will be replaced with





getting to the garden path continued



A heavy curbstone was broken in half and the two pieces laid side by side for this bridge.

6-in. ones.

When bridges are necessary, as for crossing drainage ditches, I use stone. The French Creek Granite Company at St. Peter's used to have an assortment of polished slabs which were about the size of early 19th century tombstones; they had been cut for building use, and then rejected for defects. They sold for 50¢ a sq. ft. I bought half a dozen, and they have made handsome bridges. On a frosty morning, however,

it is safer to jump the ditch.

Our longest stone bridge was originally a granite curbstone in Quakertown, 18 ft. long, 16 in. deep, and about 7 in. thick. Two veteran masons worked an hour trying to break the stone in half with hammers and chisels. A young backhoe operator named Peanuts had watched impatiently. Finally the masons gave up. Peanuts hitched a chain to one end of the curbstone, raised it about six feet, then put a siz-

able rock in place on his side of the chiseled groove and let the curbstone fall. The break was clean. Peanuts hauled the two halves to the intake ditch for the pond and laid them side by side in the dirt. The bridge was finished.

Path-building reveals and sometimes ameliorates the natural changes of the landscape. When we moved to our place in 1960, an eight-acre field along California Road was mostly open. Each summer it was white with penstemon and sparkling with cobwebs on dewy mornings. We didn't know this field intimately, so I made a path through it, clearing the narrow-leaved dogwood that was taking over, preserving the Washington hawthorns, and adding some hemlocks near the highway.

In September, when the path had been finished and its native grasses had been mowed two or three times, we discovered a colony of hundreds of closed gentians. Within a few years they would have been smothered by the narrow-leaved dogwoods, which in turn would have been smothered by the ashes, maples, elms, and hickories. So we did some careful brush-cutting on behalf of the gentians, and they are still with us. I like to watch a bumble bee force his way into the blossom, disappear, and then back out.

Occasionally we add native plants along the paths. Marsh marigolds, rescued from the route of a highway bypass, are living more securely by one of the stone bridges. A crested shield fern has thrived for years beside an old stump, and I filled a split log with black dirt for polypody—which would have preferred a rock.

The width of a path should be whatever looks right, works well, and does not require excessive labor or space. Cows move freely on trails no wider than 12 in., but people and wheelbarrows need more room. A few sentimentalists provide enough space for male and female to walk side by side, he with a tight hold to prevent slippage. More liberal designers leave a margin between the strollers, and place a bench where friendships may ripen.

Alexander L. Crosby is a freelance writer of children's books and miscellaneous publications.

TIARELLA - FOAMFLOWER

by Thomas Buchter

Tiarella cordifolia, commonly known as foamflower or false miterwort, is a member of the Saxifrage family, closely related to Astilbe, Saxifraga, Heuchera and Mitella. The name Tiarella is from the diminutive of the Greek word tiara, meaning a turban or high hat, and refers to the shape of the pistil. Cordifolia refers to the cordate or heart-shaped leaf.

There are recognized variations in the species, perhaps more of botanical

interest than horticultural interest. In Gray's *Manual of Botany* three forms of *Tiarella* are listed. Forma parviflora—a small flowered form; forma tridentata refers to a form with petals that are three-toothed; forma subaequalis refers to the near equal length of the valves of the seed capsule.

The foliage of foamflower grows to a height of 2 to 3 in. and will form large colonies under good conditions. Leaves persist through the winter, often chang-



Tiarella cordifolia



ing to shades of pink. White flowers are produced in May on racemes 12 in. tall. After flowering, new leaves and plantlets are formed on aestival runners that grow from crowns produced the previous year. This loosely knit ground cover allows perennials to grow freely with the foamflower while discouraging annual weeds.

Propagation of foamflower can be accomplished in a variety of ways. Seed collected and sown as soon as it is ripe and placed in a cold frame will germinate the following spring.

Tiarella propagates readily from division in early spring or late summer. Dividing in early spring before growth has started will give plants a chance to reestablish before hot weather. Plants divided in late summer may need more attention, watering if there is a prolonged hot spell. Winter protection of Tiarella transplanted in late summer may be necessary. Roots may not have sufficiently reestablished to prevent heaving of the newly divided plants.

Propagation by cuttings helps the gardener to increase stock quickly. Runners cut from the main plant in midsummer, cut into 6-in. lengths,

inserted in a pot of half sand and half peat, will root readily. Cuttings should be placed in a shaded frame. After cuttings have rooted they can be given more light to encourage more root and leaf growth. It is best to leave cuttings undisturbed in the pot until the following spring. In early spring the well rooted cuttings can be planted directly into the garden. Rooted cuttings planted in the fall have a high mortality rate due to the limited time the plants have to establish sufficiently to withstand winter conditions.

Tiarella is native to rich woodlands from New Brunswick, Canada, to southern Ontario, Michigan, Nova Scotia, and New England, and in the mountains south to North Carolina and Tennessee. As with many native plants living in natural conditions, wild flowers compete for light, water, and nutrients, and often cannot give a full account of their horticultural potential. When brought into the garden and given good cultural conditions, however, flowering and growth habits improve considerably. Many native plants become reliable and highly ornamental additions to the garden when freed

from competition.

Two areas in the garden where Tiarella can be used effectively are the shady garden and the perennial border. In the shady garden it thrives in rich soil shaded by large trees, allowing filtered sunlight to strike the ground. If planted under low growing shrubs in the shady garden, Tiarella will grow poorly. Most shade-loving plants will do this because light intensity is too low. and root competition with shrubs is too high. Foamflower mixes well with most plants in the shady garden such as Trillium, Hosta, Primula, and most ferns. Avoid ferns that spread rapidly, e.g., hay-scented fern.

In the perennial border, tiarella can be used where the soil is neither sunbaked nor excessively dry. Flower display is excellent when the plant is used in front of the border. Growth habit and flower color make it a good planting partner with many perennials. One combination to consider is *Tiarella* with *Dicentra spectabilis*—bleeding heart. Blooming at the same time, the white and pink are a pleasant color combination. When the *Dicentra* dies down in mid-summer, the persistent foliage of the *Tiarella* carpets the area covered by the *Dicentra*.

Another plant that can be added to this combination is *Allium flavum* 'Minor.' Planted throughout the area covered by *Tiarella*, the yellow midsummer flowers, although not identical, repeat the flowering style of *Tiarella*. The foliage is quite slender and the *Allium* is hardly noticeable until it flowers.

Consider using foamflower and other native plants. They can be a permanent addition to the garden, meeting a variety of needs from delicate detail to creating broad brush strokes of color, making the garden interesting and exciting.

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Thomas Buchter is Associate Director of the Henry Foundation. A member of PHS, he serves on the Library Committee. As a horticultural consultant, he works with homeowners to help them select plants for problem areas, and with garden maintenance.

THE STATELY SCHOLAR



by Edwin A. Peeples

Years of humid summer days ago, my wife, Mimi, and I used to go plant shopping at Longwood Gardens. This means we would rummage among the Longwood goodies, like a dowager going at a box of bonbons, select new plants to try, new trees to plant, then look for them in catalogs.

One August afternoon, as we wandered beneath some trees on the path to the Italian gardens, we suddenly realized we were amid a sound that was heavy, ominous and roughly similar to the RAF of World War II revving up for a bombing run. The pulsating hum and throb was so startling that some other visitors were alarmed and fled.

Our instinct is to explore before running. This may one day be the death of us, but, between now and then, we won't miss anything. We discovered that the air was full of honeybees and that they were not being drawn by flowers at ground level but by something in the trees.

To learn what could be in several 60-foot trees in August that would draw honeybees in almost a swarming density, we had to move off until we could get a distant view of these trees. We found, to our astonishment, that the trees were in full bloom. They had a blossom-or collection of bloomsarranged similarly to the blooms of wisteria, only not so large. Rather than being lavender, these blooms were greenish white, and each bloom was a miniature of the sweet pea blossom.

We rushed back to see what this August blooming tree could be.

The label said: "Scholar Tree. Sophora japonica."

Sometime later Mimi found a catalog that offered Sophora japonica saplings. The catalog was loquacious on the beauty and attractiveness of the tree, but vague about its preferences in soil, exposure, fertilizing, and sunlight. Nevertheless, we ordered one.

The Bush-Browns, from whom we were taking most of our early guidance, advised that Sophora liked rich soil and wished to be protected from the wind. To them, its common name was Chin-

ese scholar tree. Most other sources agreed that the tree originated in China, and everybody agreed that it ultimately grew to 80 ft., a fact that should govern placement, even if the planter won't be around to view the ultimate majesty. But trust the Japanese to get into the act. Though introduced into England about 200 years ago, Sophora didn't really begin to

"Sophora grows well under almost any conditions, including poor, rocky, dry soils. It withstands city and seacoast conditions and is comparatively free from pests and disease."

grow popular until after World War II. As soon as that happened, it began to be called the Japanese pagoda tree, hence, japonica, instead of sinensis. It is astonishing how many plants, which actually originated somewhere else, are japonica, owing to the zeal of the Japanese.

The Pictorial Encyclopaedia of Plants and Flowers, by Paul Hamlin, told us that Sophora japonica is a member of the pea family, Leguminosae. That accounts for the pea-like blossoms and, according to Hamlin's pictures, its fruit, which looks like a cross between a green pea pod and a snap bean.

Taylor's Garden Guide calls Sophora the latest blooming of all flowering trees and sets its blooming time as mid-August, which is when we saw it at Longwood, ablaze with flowers and bees. Taylor encouraged us with the news that Sophora is hardy as far north as Boston. The Encyclopaedia of Trees, Shrubs, Vines and Lawns, scouting the rich soil dictum, said the tree will thrive in well-drained, sandy loam varying from moist to dry. Finally, the Brooklyn Botanic Garden Record really came to grips with the problem: "Sophora grows well under almost any conditions, including poor, rocky, dry soils. It withstands city and seacoast conditions and is comparatively free from pests and disease."

Brooklyn could not have foreseen the pest we inadvertently wished on it. We planted our sapling in a stretch of recent fill we were trying to convert to lawn. It attracted the attention of our Irish setter. Every time a few leaves came out, our setter would stand thoughtfully and chew them off, rather like an old man picking his teeth.

Not because we ever expected to have a 60 foot, bee-gorged miracle, but purely out of compassion, we girded our Sophora with a cylinder of page wire that held the setter at bay. Our hapless specimen survived despite the setter and the soil in which we had planted it: hardpan enriched with boulders.

Presently, we built a terrace in such a position that our Sophora was always stage center. By now the tree had grown to six feet and had fans of light, delicate leaves, such as the leaves of the honey locust, Gleditsia triacanthos.

Would it ever bloom? If so, when? Not until five years ago, when it had reached 20 ft. We noticed in July of that year small racemes of lightish green punctuating the darker sprays of leaves. These clusters proved to be buds which kept growing and spreading in a fashion similar to the growth of lilac buds, except that these did not bloom in a dense cluster but kept spreading to become slender panicles.

We expected the blossoming to come late in July. It seemed improbable that a blossoming process could take a full four weeks, from the first suggestion of buds forming to the final flowering, especially in the warm, damp heat of July and August, but it did. Not until a morning around the 15th of August did we see our first flowers. They were so small, and their white so tinged with green that we couldn't be sure, until we went very close, that we were actually seeing flowers and not imagining them.

As is typical of blooming panicles, Sophora starts blooming at the bottom, or stem end, and blooms to the top, and it does this as gradually as it forms



Sophora japonica

buds. The early blooms mature and drop away long before the last buds have bloomed. The whole process takes another three weeks. All the while, beneath the tree, a gentle rain of greenish white sifts down. And I found it pleasant to suppose that Chinese scholars stood pensive in other such rains of delicate petals, absorbing some special benizen from a tree whose processes were as deliberate, subtle and perfected as the philosophy of Lao-Tse, as typified in this observation:

The prudent man avoids all suspicious appearance.

He does not adjust his hat under a phun tree, nor in a melon patch, pull up his socks,

Moderate your brilliance and difficulties will disappear.

Seen from our terrace, the upper tree was an ethereal cloud of pale chartreuse. The perfume was a light, sweet pea fragrance. As the tree stood between us and the prevailing summer winds, it bathed us with waves of scent, like Castille soap in a warm shower. We only lacked the concentration of bees, probably because we had no honeybee hives nearby. There were a few honeybees, and there were masses of other bees, butterflies and other pollinating insects.

We were jubilant. We are always jubilant when we more or less match something Longwood Gardens have done. Now we would have a tree that blossomed beautifully every August,

or so we thought.

But the next August, it didn't bloom beyond having a few panicles. Since then, we notice it blooms vigorously in alternate years, as the trees of yellow delicious apples do. It also puts out a good deal of tentative growth in the form of small twigs that spring,

"The prudent man avoids all suspicious appearance.

He does not adjust his hat under a plum tree, nor in a melon patch, pull up his socks.

Moderate your brilliance and difficulties will disappear."

like porcupine quills, in all directions from limbs and trunk. Most of this growth, especially the part that shows after about the middle of July, dies when winter comes. Much of it can be brushed off; the rest, clipped.

The natural shape of Sophora, according to all of the botanists we've read, is spreading. A spreading, 80 ft. tree should be sufficient shade for a whole convention of scholars, and a pretty sight that would be, but such a spread in front of our terrace would obliterate our view, despite the light and airy quality of the foliage. To get something taller and more slender than the standard configuration, we did some pruning.

We took the precaution of pruning our *Sophora* in the winter, in case it should be a bleeder as some trees are, and we carefully painted all of the cuts. Even so, the next summer it sulked. Not only did it not bloom, although that was its summer for a heavy bloom, it came only thinly and sparsely into leaf. We were distraught. To have our *Sophora* the shape we wanted had led us to kill it.

The next year we watched anxiously. Would it leaf, or would it stand as a gaunt, dead testament to our rashness? Came May. Light, almost yellow tendrils appeared. By June the foliage was as plentiful as ever. In August, it bloomed lightly.

Then, last summer, our Sophora, now a 40-foot beauty, gave us the real treat. It bloomed so densely that the leaves, themselves, disappeared. For three weeks a blizzard of green petals descended. The air throbbed with bees. Then the fruit formed: thousands of clusters of yellow-green beans. The tree looked more in full bloom with the fruit than with the blossoms. Also, while the leaves fell after the first hard frost, the fruit continued to hang without much change in color, until December. And there were almost as many birds after the fruit as there had been bees after the flowers.

Edwin A. Peeples is a frequent contributor to *Green Scene*. He is author of *A Professional Storywriter's Handbook* (Doubleday).

Be Wary When Plant Ads Sound Too Tempting



by Amalie Adler Ascher

Mail-order advertising returns handsome profits to firms that know how to capitalize on a gardener's weakness for exceptional plants. Extraordinary offers at prices too tempting to resist bait the buyer, who for the loss of a dollar or two, won't bother to seek redress when plants go undelivered or fail to live up to claims. Yet those dollars, when multiplied by thousands of buyers across the country, swell the treasuries of promoters, reflecting doubt on the integrity of reliable concerns in the bargain.

But the public has rights too. Though better by far to be on guard against claims not borne out by the facts, the unsuspecting buyer who finds his merchandise misrepresented or who fails to receive delivery at all need not write off his loss with meek compliance. The seller has a clear responsibility to follow the rules set by federal and state agencies, which stand ready to prevent their abuse.

Would you, for example, be taken in by the following ad? Experience the "rare thrill" of a plant in a "kaleidoscope of so many constantly changing colors that you'll hardly be able to count them all. In a range of red, gold, green, orange, and deep rich purple, giant leaves up to 7 inches long are never quite the same." For the "amazing low price of \$1 per bulb plus 35 cents postage and handling, Nature's Spectacular Rainbow Plant in its own Rainbow Colored Pot" (soil and growing instructions included) can be yours."

An apartment dweller seeing such an ad in a Sunday newspaper supplement was attracted by the showy picture of the bushy plant, each leaf in a different color mix. But although ready to write out a check and send for it, she paused long enough to call a friend better informed than she. Unfamiliar with the plant, the prospective buyer had not recognized it from the illustration, nor had she noticed the word, Caladium, printed in small letters, so intent was she on the catchy heading in much larger bold, black type. However, once aware of the facts, she was able to recognize and, thus, pass up the offering when she saw it again, this time called, the Pot O'Gold Rainbow Plant and offered by a seller operating under a different trade name and address. Still the new ad was tempting. It suggested that mere ownership would bring good luck, happiness, health and wealth, claimed it could not be found in stores, and worst of all, might never be offered again.

Read with a cynical mind, the ad should raise a few doubts. By the wording it would seem that a single tuber would produce foliage of a number of different hues. But, in reality, tubers of different varieties would be needed



to grow leaves of different colors in the same pot. Yet one tuber is all a single order buys. Nor is any mention made of just which variety that is. Generally, caladium foliage is a combination of green and white, rose and green, rose and red, or variations of these. Some foliage is additionally marked with spots of lavender or with yellow edges. Its bloom, called "thrilling" in the ad is insignificant.

Performance is also affected by the size and quality of tubers, in this case another unknown. Leaves normally vary from 6 inches to 2 feet, but in the plants offered are advertised to be only 7 inches long, so there is a possibility that bulbs are small and of less than top grade.

Given the imponderables, is the offer as "incredible" as the ad claims? Though showy and desirable either on the windowsill or in the garden, caladiums are not new, unusual or uncommon. Potted plants are readily obtainable in supermarkets, variety stores, florists, plant shops and garden centers. Tubers are routinely offered in mailorder seed catalogs. Thus, comparisons may prove that even local retail outlets offer the same product at better

quality and, perhaps cheaper, or the same prices.

One aspect of fraudulent mailorder advertising often overlooked is the purpose behind late delivery. A tree or shrub timed to arrive at the end of the season so that it barely makes it into the ground before frost can distract the buyer from the reason for his purchase in the first place, which was to receive a superior plant. He now becomes preoccupied with whether or not the plant will survive at all. If it does make it through the winter, he heaves a sigh of relief, forgetting that this was not the objective.

fraudulent advertisers move

It is not uncommon for promoters to move from place to place taking other names but repeating the same practices.

One company that operates under a number of titles is the large, Philadelphia-based American Consumer Inc., owned by Film Corporation of America. A nationwide mail order house, it advertises in newspapers offering a variety of horticultural and other products in the United States and Canada, Each new promotion carries a new trade style.

American Consumer Inc., under 25 trade names including West-Bond Nursery Sales Company and American Nursery Sales, has offered among other plants a fast-growing Paulownia tree, which is killed back to the ground each winter in many parts of the United States where advertised. Experts at the National Arboretum say that though Paulownia can be highly valuable in the landscape, it is difficult to grow.

Among other plants which have been offered by American Consumer under the above names and others were:

- · A specially developed, disease-resistant hybrid poplar, though according to the Bureau of Consumer Protection, the company actually shipped ordinary varieties not suitable for planting in many areas.
- · A flowering walnut said to produce thousands of glorious flowers, which are, U.S. postal authorities say, virtually impossible to see.
- · An incredible flowering cherry

continued

hedge supposed to yield thousands of cherries. The quantity was overstated, according to the Postal Service, and plants fail to fruit and flower as well in the East as in their native Western habitat, according to Wyman's Gardening Encyclopedia by Donald Wyman, horticulturist emeritus of the Arnold Arboretum of Harvard University.

On the basis of complaints received from across the country, American Consumer Inc. was sued by the Bureau of Consumer Protection in Pennsylvania on grounds it violated a prior court order prohibiting it from making false and misleading product claims. It also failed to honor its money-back guarantee, the Bureau of Consumer Protection claimed.

In settlement of the suit, American Consumer Inc. agreed in 1977 to pay \$45,000 in civil penalties and investigative costs, though it did not admit to any wrong-doing. The company also promised to cease soliciting orders it could not fill, to make no claims for products without reasonable basis, and to use only registered corporate names.

a postal service suit

To comply with new Federal Trade Commission regulations governing mail order deliveries and warranties, mail order firms must either deliver merchandise on time or allow customers to cancel their orders and receive a prompt refund. The agreement marked the first time the Bureau of Consumer Protection had enforced the new rules.

The Consumer Protection Office of the U.S. Postal Service in Washington also filed suit against American Consumer Inc., charging misrepresentation in the claims of performance of several plants. The Postal Service sought an injunction to hold mail for American Consumer Inc., and asked to have orders for the plants returned to the senders. The company agreed to hold mail voluntarily.

William T. Alvis, attorney for the Postal Service, said the plants challenged were Fort Laramie strawberries, black walnut, Carpathian walnut, *Ulmus pumila* or Siberian or dwarf elm, and flowering cherry hedge, actually *Prunus bessevi*.

"In the case of the strawberries," Alvis said, "they were alleged to be climbing, but strawberries just don't

climb. Plants are also advertised for hanging baskets that would produce large amounts of fruit even in the dead of winter. But it is our belief that they will not, in fact, produce fruit in the home without special light and fertilizer."

"If something promises to work miracles, it is probably a miracle if it works."

All cases were settled in late December 1978 by consent agreements in which American Consumer Inc. agreed to return all orders with payment and to discontinue making such claims with regard to these particular plants. However, the company is not thus prevented from advertising these same plants again under different claims.

Still, it wasn't long before American Consumer again began advertising the climbing Fort Laramie strawberries, this time catching the attention of Sandra McFeeley, Postal Service Attorney in the Consumer Protection Division of the Law Department, who had assumed Alvis's duties when he was reassigned elsewhere. In McFeeley's opinion, though claims were different, they were not different enough. Thus, she maintained, the company was in violation of the Consent Agreement. "For example," she said, "it was claimed that when tied to climb a fence, the Fort Laramie climbing strawberries would double in the number of vines. produce very large berries in numerous clusters, and perform equally in all parts of the United States. However, our experts at the U.S. Department of Agriculture, which test crops for use in the home garden under climatic conditions representative of 80 percent of the Middle Atlantic States, found that the berries didn't do real well. Since the variety was developed in Wyoming, it performs better in the High Plains States."

On the basis of the claims, McFeeley filed a Complaint with the Postal Service. A hearing was held before an administrative law judge, who on June 6, 1979, issued an initial decision recommending a mail-stop order, which American Consumer has the right to appeal. In that event, a judicial officer

of the Postal Service will make the ultimate decision.

Another Pennsylvania-based company against which McFeeley filed a Complaint on March 19, 1979, also in connection with misrepresenting the Fort Laramie climbing strawberries. was Hanover House in Hanover, which also operates under the tradename of Lakeland Nurseries. A Consent Agreement was reached on May 15, 1979, in which the company stated that in making the agreement it was for settlement purposes only and not an admission of guilt. It did concede, however, that the advertisement could be construed as McFeeley had charged and agreed to stop that particular form of advertising. It also agreed to refund remittances and return orders to customers as of April 18, 1979, as well as to those requesting it who had placed orders prior to that date. Should there be a breach of the Consent Agreement, McFeeley said, the company would be subject to an immediate mail detention order.

Climbing strawberries seem to be a favorite with promoters, which may account for the reason that McFeeley has been focusing on these plants. She has also filed administrative complaints on the basis of false or misleading advertising in violation of the Postal Misrepresentation Act against: Dean Foster Nurseries (a supplier of American Consumer as well as an independent mailorder house) of Hartford, Michigan. (The company, McFeeley said, ran a large ad in Family Circle magazine in September 1978 and signed a Consent Agreement agreeing to refunds as of December 1978.) Plant Corporation of America of Stamford, Connecticut, is another; also Isle of Tara Nurseries Ltd. of Freeport, New York, and Cliffdale Nurseries of Paramus, New Jersey, these two with related operations and both advertisers of the Rainbow Plant; Empire Merchandising of Brooklyn, New York; and Michigan Bulb Company of Grand Rapids. McFeeley states she has reached Consent Agreements with all but the last, though she is confident, she says, that final disposition will rule in her favor.

The Postal Service has the right idea when it comes to reading the ads. "We have a slogan," Alvis said. "If something promises to work miracles, it is probably a miracle if it works." The buyer would do well to follow that philos-

ophy. "Investigations by the Postal Service occur," Alvis explaind, "partly through customer complaints, but are also initiated by the department.itself (as in McFeeley's case) when encountering advertising that appears questionable or that sounds too good to believe. We have a split personality," he continued," on the one hand our livelihood comes from business mailers, so it is in our interests to have a good healthy mail order business. But we have a responsibility too to see that the public is not misled."

Other Views on Unethical Advertising

The Garden Writers Association of America is an outspoken critic of deceptive mail order advertising, believing it to reflect on the garden industry as a whole. "Promoters who deliberately mislead are not horticulturists," Corinne W. Willard of Wethersfield, Conn., president of GWAA, said in a telephone interview.

"You won't find their ads in plant magazines read by knowledgeable growers. Occasionally offenders are caught and are forced to pay a fine. But they make so much money, the fines don't matter."

committee works to stop false ads

An ethics committee of GWAA has been working for more than two years to "reduce and eliminate deceptive horticultural advertising and to prepare guidelines for consumers to deal with it, Willard announced at the association's last annual meeting. The organization is also attempting to persuade newspapers to reject ads making false claims. "We want the gardening public to get full value for every plant ordered by mail," she said.

Willard and Alvis agree that no matter how small the sum, the buyer should not "sit on his loss."

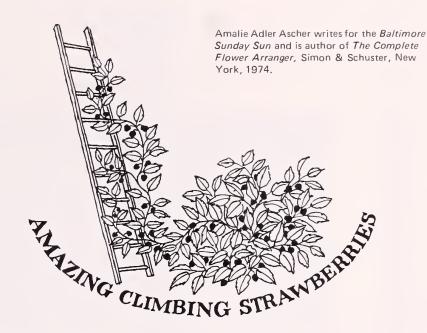
Willard told the GWAA: "Most companies that advertise by mail are highly reputable. Members of the Mailorder Association of Nurserymen subscribe to the M.A.N. Code of Ethics. Look for that logo as a sign of a company's reliability."

Since the organization attempts to police itself, it will try to help a consumer who encounters difficulty with a member.

another supporter

One who openly supports that position is Rachel Snyder, editor of Flower and Garden magazine. "The selling of plants and seeds by mail has tremendously enriched our gardens across America," she wrote in her own publication, "because it has brought us plants in infinite variety we never could have obtained in local communities . . . Unfortunately, a few bad apples in the mail order barrel have tended to besmirch the rest, but undeservedly so."

A.A.



Check List for Evaluating Offers

- In which regions of the country are plants hardy?
- What quantity of seeds, bulbs or plants are offered relative to price?
- What is the name of the variety?
- If the offer is made out-of-season, will shipment be made at the appropriate planting time both for the plant and the area?
- What are the conditions for refund or replacement? Must merchandise be returned and if so who pays the expense?
- What are the terms of the guarantee:
 Does it begin with the date of order or date of delivery, and if the latter, what happens if shipment is late? Similarly, if shipped during the dormant season is that taken into account?
- What is the age or size of plants relative to that required for production of the quantity of fruit or flowers promised?
- Are plants really of desirable variety or of one likely to cause problems?
- What is the company's record for making refunds and deliveries on time?
- How do claims of performance compare with descriptions in recognized horticultural references or in the opinions of local experts?
- Are so-called bargains really cheaper than similar or better grades found in local outlets or in proven mail houses?
- Where reports of "experts" are cited to substantiate claims, how specific are the references?
- To what degree is the buyer protected if plants are damaged or die in transit?
- Do you have the conditions and know-how necessary to grow the plant?

Your Rights When Ordering

To learn more about your rights, send for free booklets, *Shopping by Mail?*

You're Protected and FTC Buyer's Guide No. 2, Unordered Merchandise to Public Reference, Federal Trade Commission, Room 130, 6th Street and Pennsylvania Avenue NW, Washington 20580.

When ordering merchandise by mail, be ready for possible trouble by keeping original or copies of all papers connected with the transaction-the ad itself; your order, check or money order number and date; post-marked envelopes (to determine jurisdiction of the postal authorities), and any other correspondence. But do not send originals when making claims. Before informing state or federal authorities, write the company to try to settle the matter and retain a carbon or photocopy of your complaint. If no answer is received in 30 days or if no effort at adjustment is made, send a second letter to the company, and say copies are being sent to:

- The Attorney General's Consumer Protection Division of the state in which the mail-order firm is located.
- Office of the Secretary, Federal Trade Commission, Room 701, 6th Street and Pennsylvania Avenue NW, Washington 20580.
- Chief Postal Inspector, Postal Service Headquarters, Washington 20260.
- Jane Foster, President, Mailorder Association of Nurserymen, c/o Jackson & Perkins, Medford, Oregon 97501.
- Mail Order Action Line Service, Direct Mail Marketing Association, 6 East 43rd Street, New York 10017.
- The publication (if a newspaper or magazine) in which the ad appeared.

Send your second letter to the company by registered mail. Consumer protection agencies say that by this extra attention, "95 per cent of companies will come through with a satisfactory solution to your problem."

A.A.

growing interests



jasminum officinale

A single five-petal blossom of the common white jasmine (Jasminum officinale) scents an entire room, and from August through December six or more 1½-in. flowers at a time are open (up to two dozen) if the plant is more than four years old and receives adequate moisture.

"Do not put this plant outdoors too early—a late frost will damage or even kill it," advises Teresa York, an eastern gardener whose jasmine spent five years in southern New England and the past six just south of Delaware. "And don't bring it in too soon in fall; leave it out as long as possible even

after it has been root-pruned and repotted."

Like other indoor plants, this jasmine must have fresh air, light and water. Water especially, the higher the humidity the more it thrives. Lack of moisture causes the delicate, deep-green pinnate leaves to curl and become brittle-brown; misting or water spraying twice a week, as well as placing the jasmine outdoors during warm winter rains, may prevent this. Also, the plant does best in a room below 66° such as an unheated, well-lighted bathroom.

Another way to provide needed humidity is to set a clam shell among the pebbles that serve as a mulch and stop the roots from drying too fast. A 3-in. shell will serve in a 7-in. pot. This shell is kept full of water; as the water evaporates, moisture permeates the air around the jasmine. When the shell is empty, the plant needs water; York puts collected rain water or filtered water in the clam shell and in the shell at the base of her pebble-mulched melissa. All her indoor plants are in clay bulb pots or narrower clay pots, her *Aloe vera*, orange plant, *Kalanchoe tomentosa* and her jasmine.

After the jasmine has finished flowerering for a few months, the long, almost horizontal, branches can be pruned drastically to make the plant more compact and shapely. And water shoots, which grow almost straight up, are usually cut off entirely. New branches grow so quickly the jasmine may need more pruning when it is taken outside after mid-May.

York's jasmine summers in an east foundation border that is shaded after 1 pm. The soil is mostly fine sand, so compost and rich garden loam fills in around the roots of the jasmine before it is given its summer mulch of broken stone. Every three or four weeks the plant is fertilized with liquid fish, diluted with rain water. In late July the pink buds start to form; as time passes these buds become deep rose, almost red, before the pure white, fragrant, 1½-in. flowers open.

About a month before the first real frost is expected (near mid-November in York's area), she cut around the jasmine with a spade; a few days later she pruned the longest branch and repotted the plant after cutting off a long, tough root that the spade missed. After the repotted plant spent two days longer in its summer location, she carried it to the northeast screened porch where it remained more than a week; on an afternoon when the outdoor temperature was higher than the inside, over 72°, she brought the still-flowering jasmine indoors for the winter.

Devon Reay

Devon Reay gardens in Salisbury, Maryland.





philodendron scandens

My mother lives in Edinburgh, Scotland, and had to depend on an intermediary to deliver a house-warming present when we moved to Media in 1968. Her messenger was Florists' Transworld Delivery and in a letter she said she had ordered a sweetheart philodendron, FTD's representative brought not just one philodendron but a dish garden containing three or four plants. (Incidentally, I have never seen a philodendron called 'Sweetheart,' but wonder if it could have been Philodendron cordatum or heart-leaf philodendron that she saw in Edinburgh.) That was my first adventure with

house plants, and very proudly I placed the dish garden in what I thought was an appropriate place and watered it copiously. Of course most of the plants died from lack of light or soggy roots.

The philodendron, however, survived and was transplanted to a new pot with a drainage hole. For several years it grew slowly, each year pushing out a few more straggly stems that I tacked to a structural support in our kitchen with scotch tape. It was not a specimen to be proud of, but its sentimental associations assured it a place in the house.

As the years wore on the straggly shoots grew long enough for me to

tack them to the beams in our breakfast room adjacent to the kitchen. Growing towards the light the plant grew stronger and soon visitors began to ask who owned that room, Peppers or philodendron. With the increased growth I could no longer depend upon scotch tape for support and had to put tacks into the beams, and tie the stems to the tacks with thin strips of old nylon hosiery. At one stage some aerial roots developed, which clung to the ceiling. Unfortunately there are only a few of these but the tack/nylon strip combination is hardly noticeable against the pine beams.

Eleven years later we have about 80 yards of philodendron just waiting for us to move out so it can take over the house.

Jane Pepper

Jane Pepper is contributing editor to *Plants Alive* and secretary to the Haverford College Arboretum Association.

Elbert



AIR LAYERING A PALM

by George A. Elbert

Plants that grow too tall indoors present hobbyists with some hard choices. They can be drastically trimmed but always with the risk of appearing stunted; air-layered; or new plants started by means of cuttings from sections of wood. Neither of the latter methods is easy, nor do plants always respond favorably to either of these methods. Single stemmed palms have the reputation of being quite unmanage able and are usually discarded. Recently we challenged that assumption and succeeded in saving one species of palm.

A parlor palm, Chamaedorea elegans, had been a member of the family for a good many years. Having reached a height of six feet above soil level it

presented a rather pathetic appearance. It had a long, thin, bare trunk that was supported by a stake. Flowers appeared regularly but the leaves had become progressively shorter in the last two years. The time had come to replace it. But we hated to do that and considered every possible alternative before making a final decision.

Each dead leaf left behind a normal leaf scar encircling the trunk at intervals of about an inch. Just beneath each scar was a ring of five to seven short, thick growths terminating in smooth, round calluses. I have not observed them in other genera. Occasionally we had wondered idly about their possible function. Now, when we were

Roots growing out of the unpacked layering



thinking of ways to save the palm, we examined them more closely, and it suddenly occurred to us that they were similar in appearance to aerial roots emerging from the stems of some tropical aroids. Could they really have, under certain conditions, the same purpose? The way to find out was by airlayering. As there was nothing to lose we decided to try.

With an extremely sharp knife Ginny made a 3½-in. incision upwards just below the cluster of leaves, being careful not to reach the center of the trunk. She then dusted the wound with hormone powder and forced a small wad of wet sphagnum moss into the wound. While I held a much larger wad of moss over the area, she enclosed it and the trunk in a sheet of clear

plastic wrap, which she fastened very tightly, top and bottom, with scotch tape. The vertical opening in the plastic was closed with another piece of tape. Making the packing airtight is all important. In short, this was a normal procedure in the technique of air-layering.

Then we waited. Twenty days later a thick white root became visible through the plastic—long before we expected any result. The operation had worked. At the end of 10 days more, we were able to count 11 roots breaking through the moss. The time had come for the next step. We unwrapped the plastic, inserted a knife as high under the moss as was possible without damaging the new roots and cut through the trunk. The roots were 4 to 6 in. long.

We prepared a large pot with soilless mix and planted the palm, now reduced to a height of 15 in. After a month in its new home it showed all the vigor of a young tree.

As I had never heard of anyone airlayering a palm, I was curious to find out whether the accomplishment would be news to an expert on the family. So I wrote to a renowned authority, reporting our feat and asking whether it was possible with other palms. The answer did not mention any previous occurrence of air-layering, suggested the possibility with other *Chamaedorea*, but did not think it was "advisable."

A couple of months later I had occasion, for another reason, to refer

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AIR LAYERING A PALM

continued



Replanted palm

to Horticulturist, the American Horticultural Society's special issue of January 1961, which was entirely devoted to palms. On page 134 I came across the following in an article by Stanley C. Kiem:

Unusual as it may seem, it is possible to marcott, or "moss off" the top of a very few palms, namely some of the species of *Chamaedorea*. Quoting from O. F. Cook's article, entitled "Household Palms and Related Genera," in *The National Horticultural Magazine* 22:89, 1943: "An experiment of marcotting was tried by Albert W. Close and proved entirely successful. The process of marcotting is simple, merely wrap-

ping a ball of sphagnum moss and burlap around the trunk, tying it on and keeping it moist. In a few months after roots have begun to grow, the lower trunk can be cut away and the palm set in new soil."

So it had been done before. I had also learned two new terms, marcotting and moss off. The distinction from air layering is, I presume, the elimination of the incision. When I referred to my record photos it was evident that at least three of the growth rings had grown roots. But why did we experience such rapid results? Perhaps the incision did have something to do with that. Only further experiments can settle the question.

As for the opinion that the method is not "advisable"—I agree that it would be unthinkable for commercial purposes. But considering the frequency with which *indoor growers* are obliged to sacrifice overgrown specimens of these popular palms, I deem it very advisable indeed.

George A. Elbert is the former president of the Indoor Light Garden Society of America and a member of the Illuminating Engineering Society. He is author of *The Indoor Light Gardening Book* (Crown, NY 1973); *Plants* that Really Bloom Indoors (with Virginia F. Elbert) (Simon & Schuster, NY 1974); and *The Miracle House Plants: The Gesneriad* Family (Crown, 1976).

35

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Greenhouse Alternatives. See page 14.

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Front A Cellar Door Garden. See story on page 14. Cover: photo by Barbara Bruno

A cozy corner in the greenhouse. Plant with large Back leaves in foreground upper left, Ficus lyrata, smaller Cover: leaves below, Ficus benjamina. Hanging plant in upper right-hand corner Hedera helix. The pansies on the table are from the garden.

photo by Mary Lou Wolfe

The New Yorker Magazine: Gardeners in General and PHS Members in Particular

by Jean Byrne

When the late Katharine S. White moved to Maine after 34 years as fiction editor at *The New Yorker*, she began to write a series of gardening essays for the magazine. The 14 essays, which spanned a 12-year period, have recently been reissued as a book, *Onward and Upward in the Garden* (Farrar, Straus, Giroux, N.Y., 1979).* Rarely has there been such a fortuitous and superb conjunction of gardening and writing skills. While she characterized herself as an amateur gardener, her husband, E. B. White, also a writer, says in his fine introduction to the book "To write of Katharine simply as a gardener would be like writing of Benjamin Franklin simply as a printer."

White deals with the catalogs, trends and developments, the literature of gardens, flower arranging, relevant history and other subjects in an almost dazzling way.

Her opinions are delightfully stringent: "I don't like Peace. Even a small vaseful of Peace roses is grotesque." Her tolerance for some of the hybridizer's excesses is limited: "The Burpee people go for ruffles in anything. To me a ruffled petunia is an occasional delight but a ruffled snapdragon is an abomination."

On the other hand, an addict of catalogs, she undertook to review the seedsmen's and nurserymen's efforts as though she were "reviewing the latest novel." She wrote: "They are as individualistic—these editors and writers—as any Faulkner or Hemingway, and they can be just as frustrating and rewarding. They have an audience equal to the most popular novelists. . . . They are my favorite authors and produce my favorite reading matter."

Given her credentials, then, what serious gardener and writer would not be pleased to have White take notice of her/his work. The book is rife with mentions of people we all know among the nurserymen, gardeners and authors. Our special delight was that she singled out three PHS members, who have also written for *Green Scene*, for quite extravagant praise. They are Ernesta D. Ballard, Léonie Bell and Harold Bruce.

She deemed Ballard's book, Garden in Your House (Harper & Row, 1958, 1971), to be "the best book on house plants I've ever come across." She analyzes the book at length and notes: "Ballard puts on no airs. Though she knows her botany as well as her horticulture, she is a clear and concise writer who never speaks through the dark glass of technical language. She is also a practitioner, not a theorist, and has grown every one of the more than 550 varieties of plants she lists." Several years later when Ballard's The Art of

Training Plants (Harper & Row, 1962) came out, she again referred to Garden in Your House as her house plant bible and wrote: "I read the new book eagerly, even though I had long since decided that life was too short to be involved in the Occidental fad of growing dwarf trees in the ancient Oriental manner. Ballard's book opens new vistas . . . full of common sense and clear advice, based on her own experience."

The second member and Green Scene writer to come in for kudos is Léonie Bell. Bell coauthored The Fragrant Year with Helen Van Pelt Wilson (Barrows. 1976) and also did all of the illustrations. Of these, White writes, "Bell is an outstanding botanical artist, with the ability to make her pale-black pencil drawing create texture and character, and sometimes magically. or so it seems—even color. Her detail is amazing, yet her drawings are works of art; for accuracy, they surpass any color photograph and most of the black-andwhite textbook botanical drawings I have seen of late." She singles out a chapter on Bell's special field of interest: "The chapter on roses, obviously a labor of love, is one of the most rewarding-on fragrance, on species and varieties, and on the history of the rose strains."

The final member and Green Scene author that she singled out is Harold Bruce, who wrote The Gardens of Winterthur in All Seasons (Viking, 1968). White pronounces it the most beautiful and readable of all garden books that year (1968). She writes: "if you can't get to Winterthur, Harold Bruce's book and the Hampfler photographs will make you feel you have been there." She continues "His prose is far removed from the turgid writing of most horticultural scientists . . . He hasn't attempted to write a botanical handbook, and, as a taxonomist he has had the courage to change the rules of the gobbledygook of current Latin." Bruce also gives practical advice for home gardeners in the book and White claims, "I'll have learned a lot about the small home garden from Harold Bruce, and I am especially grateful for his notes on hardiness, for I have been nursing along plants that will never flourish in our own Zone. . ."

Lest I be accused of chauvinism in selecting out *Green Scene* writers, let me say that as an editor, I find the book soars. There is a vigorous blend of wisdom and knowledge, advice and sheer crustiness. Her two chapters on the trends in flower arranging, in which happily no one from our area is mentioned, were nonconformist to say the least; it should be essential reading for all Show exhibitors.

Illustration by Léonie Bell, *The Fragrant Year*, M. Barrows & Company, Inc., New York, 1967.

^{*} Available on loan from PHS Library

t

A summer corner for a shady greenhouse is built with a border of cobblestones around a floor of gravel. The plants are placed in pots. The towering plant is Ficus Ivrata: the fern in the lower lefthand corner is Nephrolepsis exaltata (Boston fern); the pink flowers in the center Euphorbia pulcherrima and the spiky variegated plant next to the poinsettia is Neoregelia carolinae 'Tricolor.' Since this spot was one of the most vulnerable in the freeze, the summer corner was moved out in late September and heat cables were laid down to supplement the gas heat. Plants tolerant of cool temperatures, e.g., camellias and ferns, were then put in the area.

PEOPLE WHO LIVE IN GLASS HOUSES

by Mary Lou Wolfe



I blame it all on a Pennsylvania Horticultural Society Indoor Garden Visit, One January Sunday in 1977 my husband and I, suffering from a touch of cabin fever, toured city and suburbs to see how inventively members coped with Philadelphia winters. What we saw in Society Hill and Narberth, Mount Airy and Chestnut Hill only aggravated our winter malaise. We saw glorious, imaginative alterations to an old stone farmhouse, to a venerable town house and a smashing four-story dwelling, all light and air and greenery. At the end of the afternoon tour we were exhausted, exhilarated and agitated. Our cabin fever worsened over the weeks. Our Victorian town house had been designed long ago for privacy

from the houses close on either side. The southern wall was windowless and the morning sun whisked through the living room and disappeared for the day. We consulted an architect friend who diagnosed our fever as "glass-houseitis with complications of envy." His treatment, designing alterations for our modest house, brought temporary relief. However, when the time came to sign the construction contract, the true dimensions of the disease became evident. Wonderful new bay windows in the living room were not going to cure my longing for lots of glass, a southern exposure, gravel underfoot and Ficus pumila creeping up the walls. The disease had gestated through the predictable stages of windowsill gardening, terrariums, light gardening, and glass porch to the terminal stage of GREENHOUSE.

We cured "glass-house-itis" by moving to a house we had long admired. next to friends we dearly loved. This house was nestled against a hillside, and adjacent to the kitchen on the southeast side, was the perfect site for a greenhouse. I should add that this new home also provided my husband with an excellent carpentry workshop space, which he needed just as much as I craved glass. Before we had even moved into our house we tramped through snow with measuring tapes and catalogs, accompanied by an experienced greenhouse contractor. We chose a lean-to model that provided the largest glass space possible, a curving roof and glass to the ground. It was not practical to extend our oil-fired hot air heating system so we followed the advice of our contractor and ordered a propane gas heater with outside vent. The promise "under glass before November" was kept and our collection of old favorite plants was moved in before frost.

BEFORE (Four weeks after the freeze)



Platycerium bifurcatum on cork



I revelled in the crisp gravel underfoot, the deep sink to slop in, the automatic ventilator, but most of all, at the accessibility of this new room. Sliding glass doors opened from a sunny hall connecting kitchen to living room. A

... the heater malfunctioned: moisture in the fuel line blocked production of heat while the fan furiously blew in 2° air.

sliding screen door kept dachshunds and kitties out of the greenery. With my history, it was obvious that we would use our greenhouse as a conservatory or sun room rather than for extensive propagation. A slate table and Mexican leather chairs fit beautifully. We settled into life in the glass age.

I quickly discovered the delights of reading the Sunday N.Y. *Times* under glass, writing letters, breakfasting and even paying bills under glass. Rain and red maple leaves pasted on the graceful curving eaves were enchanting. A string of migrating geese viewed through the roof was unforgettable. Friends contributed special plants: a stately *Araucaria*,

unusual *Crassula* cuttings, a rare dwarf kumquat and *Ficus pumila* to creep up the white stucco walls.

Soon fluorescent lights and a pierced tin lantern made up for the shrinking sun and extended evening gardening and sitting hours. On dark, snowy mornings I would switch on the greenhouse lights before walking dachshunds on the cold hillside. How cozy and bright that little curved house looked, protected from the prevailing westerly wind and glowing like a jewel. I photographed it at dawn one early January morning so my scattered family could share the sight.

By mid-February everything in the greenhouse awaited spring. My *Hoya carnosa* had stunning blooms, *Pittosporum* flowers scented the air and the small *Clivia* had produced its first bud. Saturday, February 17th was one of the pleasantest days of my life. It was the first sunny weekend in months and eight inches of snow reflected that sun dazzingly. From my husband's workshop came a fine little greenhouse bench fitting just above the propane heater and extending the windowsill

continued



Fatshedera sp.





Platycerium bifurcatum on osmunda





into the kitchen. Into this bench went a heating cable, hardware cloth, perlite, and presto—cuttings. Geraniums, Sedum morganianum, impatiens, all tucked into a moist, warm bed. Lunch in the sun, dachshund noses pressed against the screen, and absolutely no cabin fever.

We left the greenhouse lighted that night when we drove across town to have dinner with friends and noted that the outdoor thermometer was dropping toward zero. Sometime during our five-hour absence the heater malfunctioned: moisture in the fuel line blocked production of heat while the fan furiously blew in 2° air. We returned to a brightly lighted greenhouse full of grotesque greenery—either crisp or limp. We dialed the propane emergency service and moved everything possible into the kitchen.

Waiting for the repair truck was like being at a wake. Plants I had nurtured for 20 years were obviously dead along with the new exotic gift plants. The only sure survivors were the cableheated cuttings in the brand-new bench and the *Ficus pumila* climbing on the wall. On Sunday we interred the *Araucaria*, the dwarf kumquat, the *Hoya* and a host of others. It's no fun making compost of old friends. By

nightfall I felt like stoning that greenhouse salesman.

After a night's sleep, phoning seemed more practical than stoning. My friendly representative rose to the telephone challenge and defused my anger with his candid answers and practical suggestions. He admitted that recently installed propane heaters were not proving as reliable as older ones, and yet, of all such heaters manufactured,

Plants I had nurtured for 20 years were obviously dead along with the new exotic gift plants.

this company's worked best. Guarantee? Only "to operate past start-up and replacement of parts for a year." For our problem—"a bit of moisture in the line"—the suggested treatment was to increase insulation of exposed tubing. There was no guarantee that it wouldn't happen again. The gist of our conversation was that people who live in glass houses should do disaster planning. He promised to send information that would help.

Back at work I felt my black arm band must be visible to all. Since my job at PHS puts me in the thick of the horticultural community, I quickly discovered that the frigid weekend had

affected greenhouses far more professional than ours. I began an experience akin to group therapy. I heard about disasters of earlier years and learned about ingenious survival tactics. George Clark left his greenhouse one January, under the care of a friend who had to cope with an ice storm. Nine branches crashed through the glass. Borrowing tarps from a builder, she flooded the greenhouse floor with hot water, saving ninety percent of the Clarks' collection. The advice from another experienced plantsperson, Sally Reath, was to keep track of what survived and concentrate on those plants in the future. Other wise friends urged pruning and patience for plants that might regenerate. I pruned with a heavy hand and heart. Bougainvillea, Hedera helix, Podocarpus all got the axe and were photographed like criminals. Perhaps after warmth, water and well-wishing there would be something to contrast to the "mug" shots. The pictures on these pages illustrate some of many successful comebacks.

As promised, the packet of disaster planning materials arrived, followed by another most helpful 45-minute phone call from our greenhouse salesman. We discussed every greenhouse owner's worst dreams: power failures, freezing,

cooking, flooding, you name it. At the end of this article you'll find a list of some simple, unsophisticated treatments for greenhouse traumas and also a few names and addresses of suppliers of more sophisticated mechanical solutions. Among the latter is a service that really appeals to me. It not only costs considerable money but requires an extraordinary friendship. I'm sure it would improve the quality of life under glass. It involves a battery-operated alarm system which when activated by power failure or the high/low temper-

ature you have chosen, will alert up to five telephone numbers. Either an answering service or a recorded message will proclaim the SOS, the first number of course, your own, then your foreman (who has a foreman?) and next, a very good friend (best, one who lives close-by).

I'm giving a lot of thought to those phone numbers. It would be ideal if I could find someone for whom I could perform the same service—someone with a greenhouse. Now that I think of it, my closest neighbors, the ones I've known longest, do very well with windowsill gardening. Perhaps a terrarium equipped with a gro-light would be a nice Christmas present. Then, in January we'll invite them for brunch in our greenhouse before the Indoor Garden Tour. Is it too much to hope that they'll arrive with a touch of cabin fever?

Mary Lou Wolfe is the PHS horticultural librarian. She feels she is facing this winter more prepared than last.

FATALITIES

Schlumbergera bridgesii (Christmas cactus)
Impatiens (New Guinea hybrids)

Begonia Rieger's

Asplenium bulbiferum (mother fern)

Asplenium bulbiteru
Lygodium scandens
Echeveria sp.
Spathiphyllum sp.
Amaryllis sp.
Pelargonium sp.
Aloe variegata

Sedum morganianum Sedum pachyphyllum Browallia sp. Araucaria sp. Fortunella hindsii Crassula sp. Hoya carnosa Podocarpus sp. Clivia sp. Cvclamen sp.

SURVIVORS

Ficus pumila

Pittosporum tobira 'Variegata'

Fatshedera lizei

Ceropegia woodii (rosary vine)

Mammillaria sp. Tillandsia ionantha

Platycerium bifurcatum (staghorn fern)

Hedera helix Bougainvillea sp. Cyperus sp.

PEOPLE WHO LIVE IN GLASS HOUSES SHOULD PLAN FOR EMERGENCIES

Auxiliary heat

If you have power:

Electric space heaters: require high-load, 3-prong electrical outlet. Should be stored away from greenhouse and used for emergencies only unless specifically designed for humid conditions of greenhouse.

Those designed for greenhouse use are available with thermostat to activate automatically when temperature drops.

During power failure:

Hibachi stoves: use on greenhouse floor. Provide fresh air intake if used more than a few hours.

*Coleman camper stoves

Salamanders: portable space heaters that burn kerosene

ALH, Inc., Nashville, TN, a subsidiary of Aladdin Industries, Inc.

P.O. Box 7235, Nashville, TN 37210

Open flame thermostatically controlled gas heater using L.P. gas or natural gas. Some models require vent pipe.

Southern Burner Co. P.O. Box 885

Chickasha, OK 73018

Alarms

*Thermalarm: rings bell or buzzer in your home when temperature in your greenhouse drops or rises above specified temperatures. Extra power failure relay available.

*Phon-alert dialer for use with *Thermalarm: dials up to five different telephone numbers to announce a temperature emergency or power failure in your greenhouse. Available through a number of companies.

E. C. Geiger Box 285

Harleysville, PA 215-256-6511

*Digital communicator: a central station two-way communication system which can signal various emergencies such as greenhouse temperature problems, home intrusion, fire. Available through a number of alarm companies. One of these is:

Security On-Line Systems, Inc.

6198 Butler Pike

Blue Bell, PA 19422 215-628-9190

Miscellaneous aids and suggestions for cold emergencies:

Insurance: frozen pipes and broken glass are generally covered under homeowners' policies; frozen plants are not. My insurance agent suggested Lloyd's of London for plant collections that merit expensive coverage. (Out of my league.)

Tarps: spread over exterior roof to retard heat loss.

Misting frozen leaves as they thaw may prevent some foliage loss.

Run hot water on greenhouse floor.

Clear or black plastic spread over plants may prevent damage.

*Trademark name





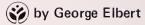
WONDERLITE

A modified mercury-vapor bulb matches the performance of fluorescent tubes in maintaining house plants and bringing them into bloom. It also expands the possibilities for placing large plants in out of the way spots indoors.

Superb as the results have been in growing plants under fluorescent light, many indoor gardeners have wished for some source of artificial light that would not set such severe limits on the size of the plants. They have wished, too, for less cumbersome fixtures. better suited to home decoration. People prefer a bulb either like the normal incandescent filament, or the familiar flood and spot lamps. A succession of these have been tried and found wanting until the Wonderlite came along. It is a product of the Public Service Lamp Corp. in New York City. How the experiences of amateur indoor gardeners with fluorescent lamps prepared them to understand and appreciate this bulb is worth recounting as a peculiar chapter in horticultural history.

In the 1950s it was discovered that plants are especially dependent for growth and bloom on the blue and farred light of the sun's spectrum. Manufacturers promptly formulated and marketed fluorescent lamps that emitted most of their light in these colors. For a long time amateur growers were more concerned with engineering data and graphs than with the performance of their plants. But eventually a credibility gap developed between growers and the light experts when they came to realize that plants were not responding as well as was to be expected from manufacturers' claims.

Nobody, then or now, has questioned the blue/far-red evidence. Something else, however, was involved. Sheer quantity of the two important colors was not enough. Perhaps plants were selective even within these ranges and perhaps they also needed some amounts of the other colors. In any event, technicians began to catch on that something was wrong and manufacturers came out with lamps touted as being equivalent to sunlight but that actually were just a wider mix of spectrum colors. At least they were better than the



original lamps. Nothing definite has been learned about how to define a plant growth spectrum. As far as house plants are concerned, the real discoveries (except for the blue/far-red) have been made by amateurs. They solved their problems empirically.

amateurs' solutions superior

Amateurs, dissatisfied with manufacturers' claims, continued to try different fluorescent lamps. And it was not long before they concluded that a combination of Cool White (CW) and Warm White (WW) tubes was superior to any of the specially formulated "growth" lamps. The U.S. Department of Agriculture, after a number of false starts, gave its blessing to this combination-long after the majority of indoor gardeners had switched to it. A pleasant twist is that CW and WW are the cheapest and most common commercial lamps on the market. Among standard fluorescent lamps they also have the highest visible light output.

Since then the only improvement in fluorescent tubes for plants has come from the Verilux TruBloom lamp, originally formulated for other purposes. Its merits were discovered only by chance—and again by amateurs. They found that it produced more compact and more floriferous plants, although the light was softer, and considerably more natural in color to the average eye, than other lamps.

Without these experiences the value of Wonderlite might still be unrecognized while light gardening hobbyists continued to pore over lists of specifications, such as lumens and graphs of spectral distribution. They had learned that plants didn't necessarily follow the scientific theories; the only criterion for judging a lamp was how well the plants grew and bloomed.

While testing fluorescent tubes on their plants, amateurs had also learned about the various types of bulbs. They found that incandescent filament lamps were too hot and very inefficient in growing. The small reflector plant lights that are still being sold everywhere were never taken seriously by serious growers. Multi-vapor metal halide lamps are unstable in color. Sodium vapor, though highly efficient light producers, are unsuitable for home use because they put out heat and have a ghastly yellow color.

Mercury vapor lamps seemed at first to offer some degree of improvement. The bulb incorporated the ballast and could be installed in an ordinary light socket. But, here again, color was inadequate—a steely blue, lacking in the necessary red rays. It was a stopgap until something better came along.

About two years ago, when involved in some practical tests on plants using normal mercury vapor bulbs, the Public Service Lamp Corp. sent me two sample bulbs of a new type that they described as mercury vapor with the addition of a chemical called 'Phosphorsol' (patent applied for). It was immediately apparent that, to the bluish color of the ordinary bulbs, a strong dose of orange and red had been added. I placed a number of plants not yet in bud under these lamps. Within two months I could report a definite result. All the plants had set buds and bloomed satisfactorily. Among these were some that demand high light intensities, such as Jatropha integerrima, lantana and geranium. No other bulb had even



approached this degree of effectiveness. a revolutionary breakthrough

Because my own experiments are unscientific, without systematic controls, we needed confirmation from other sources. Sample lamps were distributed to many amateur light gardeners. The reaction ranged from neutral to enthusiastic as was to be expected, but no one condemned the lamp except rival manufacturers. Enough time has now passed, and the lamps are installed in so many homes and institutions, that there is no longer any doubt that

Wonderlite can succeed with the big plants that do not fit under the fluorescents. And it eliminates the need to keep geranium, lantana, crossandra, clerodendrum dwarfed.

Wonderlite represents a revolutionary breakthrough in lighting plants for growth and flowering.

You can use Wonderlite to grow plants from one ft. to five ft. in height. Suspend it in a shade directly over the plants. It fits various types of adjustable-head standing lamps. It can be used in an electrified pressure pole, installed in track lighting or recessed in the ceiling. In short, it can be used in exactly the same way as an incandescent reflector lamp.

This bulb does not eliminate the necessity, familiar to fluorescent light hobbyists, of placing plants very carefully in relation to the source. Though it is much cooler than an incandescent flood, figure 1½ ft. as the minimum distance between the tops of plants and the bulb. The maximum distance is about 4 ft. High light and blooming plants must be close to the lamp and lower light plants progressively nearer

to the outer limits. For each category of plant the matter of a few inches closer or farther away may make the difference between success and failure in maintaining and blooming.

Except under laboratory conditions we can establish no exact rules for distance. In a high humidity environment the plants can be placed further away than in a dry atmosphere. Ventilation and temperature also play roles.

wonderlite-what is it?

The Wonderlite is a 160-watt mercuryvapor lamp shaped like an ordinary incandescent reflector bulb (spot or flood, called a PAR) that fits into the normal size home socket. The socket must be ceramic, as for all wattages 150 or over. The interior is coated with a silvery reflector that extends down the shank to within 11/2 in. of the base, Mercury-vapor lamps go through two phases in lighting up, the first lasting two or three minutes, after which it achieves true color and intensity. If the lamp is turned off it will not light up again for three or four minutes. The switch, however, can be turned on immediately after darkening the lamp and the cooling phase will proceed normally. In practice there is no problem.

The guaranteed life of the lamp is 12,000 hours, which is six times that of a spot or flood. The growth area covered is at least a yard in diameter, which is equivalent to that serviced by a pair of two tube, 40-watt fluorescent fixtures (160 watts). At \$45 to \$50 per bulb retail, initial cost and operating expense is only a little more than the fluorescent installation, with the advantage of much greater versatility. For commercial situations, special order Wonderlites with higher wattages are even more efficient. That is to say that a 300-watt bulb emits more than twice as much light as a 150watter, and can cover more than twice the area.

Each grower must learn to judge according to experience and knowledge of the plants.

Consider that fluorescent lamps confine our growing (except when many lamps are used) to the height of a table model unit or the space between shelves—a matter of $2\frac{1}{2}$ ft. at the most. In calculating the size of the plants we can grow, we must deduct the height of the pot. Larger plants have taller pots. Thus we can figure on no more than a plant 2 ft. high—and that is exceptional. This limitation is principally because the large amount of light fluorescent tubes produce is distributed, and diluted, over the whole length of the lamp.

A bulb that emits the same amount of light as a fluorescent tube concentrates it initially in a small area and, though the drop-off is more rapid as the distance from source increases, it starts out very much stronger. When we use a fluorescent tube we string the plants out all along its length, with their tops very close to it. Under a bulb, such as Wonderlite, we achieve the greatest amount of coverage by arranging the plants in a circle. The diameter of the blooming area is about 3 ft. when the tops of the plants are 2 ft, below the lamp, A few low light flowering and most foliage plants succeed at up to 3 ft. At greater distances below or to the side, the light is sufficient only for foliage growth.

A company chart (Fig. A) demonstrates these figures. Beyond 4 ft., only a very few kinds of foliage plants can survive. If it is considered, for instance, that a Wonderlite bulb in a 9 ft. ceiling (most are 8 ft. these days) can take care of a 5½ to 6 ft. plant, that is quite an accomplishment.

A problem with all tall plants is that an overhead light source does not reach down far enough to prevent leaves dying off at the bottom. Where plants are set in corners the lamp should be angled toward them rather than set directly above. Where large groups of plants are away from a wall, two or more lamps angled from the side are most effective.

time for lights

How long to burn the lights each day depends on the types of plants you are growing. A collection of low light foliage plants—such as ti and cornstalk—may need only 8 hours if close to the bulb, though 12 to 14 hours if distant from it. High light foliage and

flowering plants usually need the longer period. Do not take the lists of light requirements supplied by various experts too seriously. A parlor palm and a bombax (one low light and the other supposedly high light) have been flourishing together in my living room for a long time at a distance of 4 ft. from the bulb. Flowering plants usually have to be rather close, but many an African violet or terrarium plant will bloom much further away.

Compared with fluorescent tubes the Wonderlite is more successful in blooming plants that require high light intensities. Orchid growers have found that they can bloom cattleya and vanda and many other species and cultivars that have been nearly impossible up to now under artificial light. They have been enthusiastic about the bulb both for growing indoors and as supplementary light in their greenhouses.

The problem of blooming most house plants has already been solved with fluorescent tubes. Wonderlite can succeed with the big plants that do not fit under the fluorescents. And it eliminates the need to keep geranium, lantana, crossandra, clerodendrum—names I pick out of the hat as typical—dwarfed. Annual plants can be permitted to grow much bigger.

The use of this lamp in the home, therefore, is dictated not so much by the kind of plant per se as by its size. The Wonderlite can handle the big ones. For example, large succulents make ideal subjects. It is in places like offices, lobbies, stores and restaurants where the maintenance of large display plants has become increasingly expensive, that the bulb can make a significant difference.

In the lower light categories, to which most of these display foliage

plants belong, the repertory is very wide. All the familiar ones that are sold in florist and plant shops do well. For example, if you want to grow a big polyscias, a ficus or a palm, in the interior shaded area of a room, Wonderlite gives you the means to do so. You may have seen such plants growing under ordinary mercury-vapor or incandescent floods in department stores, but you can be sure that they do not last for long and must be replaced.

Fluorescent light's great accomplishment is that it enabled everyone to grow small plants without benefit of sunlight. The large sculptural and display plants still had to be placed near a window where they received sufficient daylight. In institutional situations where they decorated corridors and lobbies, continuous rotation of new nursery plants has been necessary. As large plants have become established as an integral part of interior design the plant/window formula seriously limited the freedom of interior architects and decorators-unless the problem was simply ignored, affecting the treatment of windows and of furniture placement. Now that Wonderlite makes it possible to maintain plants for longer periods without sunlight, this restriction is lifted. If the bulb comes into more general use it will influence space organization and furniture design in homes and wherever else large decorative plants are grown indoors.

George Elbert is past president of Indoor Light Garden Society of America, Inc. He is also a member of the Illuminating Engineering Society. He wrote, with Virginia Elbert, Plants that Really Bloom Indoors (Simon & Schuster, NY 1974) and The Miracle House Plants (Crown, 1976).



Figure 1: A genetic chimera in Exacum affine, Half the plant produces purple flowers and half produces white flowers.

Figure 2: The currently available *E. affine* 'Blithe Spirit' (right), and the recently developed but not yet released mutant by Penn State University (left). The mutant is self-branching and therefore needs no pinching.



NEW PLANTS FROM RADIATION

Yellow violets? Fire engine red violets? There's no end to the scientists' imagination.

by Randall P. Niedz

Ever since geneticists Muller and Stadler showed that man could "create" genetic deviants or mutations with X-rays, and at a much higher rate than naturally occurring mutations, geneticists have been excited by the idea of using radiation to artificially mutate plants to improve their usefulness to man. Within the last 15 years several hundred mutant plants, food and ornamental, have been released to the public.

nature and effect of radiation

The primary cause of mutations in living organisms is radiation—natural and induced. Natural mutations are caused primarily by cosmic rays, which consist of high energy particles, and various forms of solar radiation. For example, the type of cosmic ray that causes skin to burn or tan is ultraviolet radiation, and the cosmic ray that warms the earth is infrared radiation.

Induced mutations are caused by radiation and chemicals. The radiation used to artificially induce mutations is the same as the cosmic rays that constantly bombard the earth, except they are administered by scientists at dosages higher than found in nature. By way of illustration, it takes several hours in the sun to develop a tan (or burn), while only a few minutes under a store-bought sunlamp are equivalent to those hours spent under the sun. Physicians make use of cosmic rays. When an X-ray is taken of our bones we are simply being exposed to a higher than normal dosage of a specific, naturally occurring

continued





Figure 3: Penn State University is developing a cascading *E. affine* (right) for hanging baskets and an upright (left) for windowsills or table tops.

Figure 4: Exacum on the right mutated to the white Exacum on the left. The mutant white is the same as the plant in Figure 2.

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the green scene • nov. 1979



cosmic ray.

Radiation causes two basic types of changes-genetic (inherited) and physiological (noninherited). Genetic changes are commonly known as mutations. Bjorn Sigurbjornsson, a well-known scientist in the field of mutation induction in plants, has defined a mutation as "a sudden change in the hereditary material of an organism." Mutations that occur naturally are called spontaneous mutations. Artificially induced mutations, in principle, are the same as spontaneous mutations but simply quicker and more numerous. Furthermore, like spontaneous mutations, almost all induced mutations are deleterious in their effects on the plant. The question is often asked why mutations are so often harmful to a plant. The answer is analogous to someone randomly adding, removing, or rearranging the parts of a finely tuned automobile engine, the most likely result of such tampering is of course a poorer engine rather than a better one. However, once in a while a beneficial mutation occurs that increases the plant's ability to survive and, hence, its usefulness to man. For example, a plant may mutate to a form more resistant to a certain disease, or a form that has larger and showier flowers, thereby making it more attractive to pollinating insects.

Noninherited changes are commonly known as physiological changes. A noninherited change is different from a genetic change in degree rather than type. For example, a plant that is exposed to radiation may grow more slowly for a few weeks after treatment and then resume normal growth thereafter.

use of radiation in plant breeding

The use of mutation breeding to improve plants is particularly valuable in ornamental crops, for unlike food crops that are generally adversely affect-

ed by induced mutations, such characteristics are more highly valued in ornamentals since novelty is usually a virtue. Horticulturally important traits in ornamentals would include, for instance, flower color, flower number, flower

One of the primary goals of the African violet breeding program at Penn State is the development of the canary yellow violet.

size, foliage variation, plant form, and disease resistance.

The number of mutations, good and bad, that can be expected depends upon the type of radiation used, the dose of that radiation, the species of plant irradiated, the age and condition of the plant, the type of plant material treated, and the genetic background of the plant. Since so many variables are involved, mutation rates of 10% to 60% have been observed. Another important characteristic of induced mutations to be kept in mind is that the majority of mutations will not be seen in the treated plants. This phenomenon is easily understood with a basic knowledge of genetics, but all it means to the plant breeder is that seed must be collected from the treated plants and grown out for observation. Metaphorically, this means that any mutations caused by the radiation will be seen in the offspring of the treated parent plants.

mutation breeding at Penn State

Under the direction of Dr. Richard Craig, breeder and geneticist, one of the current research programs at The Pennsylvania State University is directed towards plants that flower under relatively low light conditions. Two of the primary plants being worked with at Penn State are *Exacum affine* (Per-

sian violet) and African violets. These two plants are not related.

Exacum affine is a plant that will flower profusely indoors on any bright windowsill. Its ability to bloom prolifically with dozens of flowers is unmatched by any house plant, including African violets. Purple or white flowers contrasted over a glossy green foliage make an impressive color combination rivaling any flowering species. However, E. affine is extremely susceptible to Botrytis, a common fungal pathogen that plagues all greenhouse operators. Botrytis susceptibility is one of the primary reasons E. affine is not commonly used in the home like the African violet. Furthermore, the number of commercial cultivars of E. affine is extremely limited (about six) and represent plants with either purple or white flowers and fairly uniform foliage.

Bearing these characteristics in mind Craig chose to initiate a mutation breeding study. He hoped, through the use of radiation to induce mutations, they could develop plants resistant to Botrytis, as well as a greater variety of cultivars. Figure 1 pictures an Exacum with a mutation known as a chimera. Onehalf of the plant has white flowers and the other half purple flowers. A chimera is when one plant has cells that are genetically different from another. The word "chimera" is taken from the creature in Greek mythology that had a lion's head, a goat's body, and a serpent's tail. In mutation breeding chimeras are very common and can be manifested in a variety of ways. Many times the chimera is only a single branch that is different from the rest of the plant. If the chimera is attractive it can be cut off and grown into an entire plant exhibiting that characteristic.

An example of an improvement through mutation is shown in Figure 2. The plant on the right is the current commercially available *E. affine* 'Blithe

Spirit' and the plant on the left is a mutant developed at Penn State. *E. affine* is usually pinched to encourage branching, but the mutant is self-branching and requires no pinching. A self-branching plant is very appealing to a commercial grower who is constantly trying to cut costs. Furthermore, the mutant is tremendously floriferous in contrast to 'Blithe Spirit,' an unquestionable plus. The biggest plus of all, however, cannot be photographed; this Penn State mutant also shows potential resistance to *Botrytis*.

The African violet is another plant that is part of the extensive breeding study by Craig and his students. African violets are unique plants to work with in a mutation breeding program since they do not form chimeras. The reason? African violets are vegetatively propagated and each new plantlet originates from a single cell in the petiole of the leaf. Therefore, a plantlet that originates from a mutated cell will have the characteristics of that cell and that cell only. This not only makes the African violet a convenient plant to work with since no chimeras are formed, but also provides a very accurate count of the mutation rate of a given radiation treatment. A lower than actual mutation rate is often observed in the treatment of multicellular growing tips (e.g., a seedling), as done with Exacum affine. Treating a seedling involves the problem of intrasomatic selection: a mutated cell will have to compete successfully with non-mutated cells in order to express itself. Therefore, a mutation, if induced in the wrong tissue layer, can occur and never be seen, a flower color mutation in a nonflower producing tissue layer, for instance. Data from various mutation breeding studies show that plants such as African violets and Streptocarpus, which originate from a single cell when vegetatively propagated, consistently exhibit higher mutation rates than treated seedlings.

One of the primary goals of the African violet breeding program at Penn State is the development of the canary yellow violet. Traditional breeding attempts are futile in achieving this goal since there exists no gene in the genetic machinery of the African violet that codes for yellow flowers. This means that the gene for yellow flowers must literally be "created," and that is where the value of artificially inducing mutations through radiation will be realized. Another goal, though probably not as difficult as the yellow violet, is the development of the fire engine red flower.

mutation breeding for the home hybridizer

Is it possible for the home hybridizer to become involved in mutation breeding? Yes. All that is needed is an ordinary sunlamp, which is easily purchased at any department store. A sunlamp operates by emitting ultraviolet radiation (UV). This type of radiation

Is it possible for the home hybridizer to become involved in mutation breeding? Yes.

has low penetrating power and, therefore is not a genetic danger to plants and animals. However, by treating only the pollen of a flower it is possible to induce mutations. To begin, one needs a plant in flower and a sunlamp. Remove all the anthers from a flower and extract the pollen onto a sheet of paper. Since many variables are involved in the number of mutations induced we will treat several groups of pollen with varying dosages of UV from the sunlamp. Divide the extracted pollen into about eight groups. When treating, simply place the sunlamp from 12 in.

to 15 in, away from the paper sheet on which the pollen rests. Now take group one and treat for two minutes, group two for four minutes, group three for six minutes, group eight for sixteen minutes, etc. It's important to keep each treated pollen group separate. Each group will be used to pollinate individual flowers; therefore, remove all the anthers from those flowers to be pollinated with treated pollen. Anthers are removed to prevent pollination by untreated pollen. Now take each group and pollinate a flower or flowers by placing pollen on the stigmatic surface with a toothpick. After pollination tie a small tag around each flower indicating which group of treated pollen was used and the date of pollination. Flowers that fail to develop seed pods were flowers pollinated with pollen killed by the UV. The highest number of mutations will come from those seed pods pollinated with pollen just exposed under the lethal point. After seed pods have ripened and seed is collected it must be sown and grown to flowering. Very few mutations will be seen in these plants as explained earlier and, therefore, the plants must be self-pollinated and seed collected. This second generation of seed when grown to maturity should exhibit a variety of mutations.

Use of sunlamp radiation on small seedlings to bring about genetic changes has not been fully investigated and offers some real experimental opportunities for the home gardener.

Randall P. Niedz is a graduate of Penn State University in horticulture and is currently pursuing a Ph.D. in plant breeding and genetics at Michigan State University.



greenhouse alternatives

y by Barbara Bruno

Each autumn as the time came to move the house plants inside for the winter I have been faced with the same agonizing decision-which plants will be abandoned to the cold for lack of window space? How could I squeeze all of my treasured collection, vigorously grown larger over the summer, back into the cramped windows of a house already bursting with potted greenery? I discovered that some space could be saved and the collection preserved by keeping only small, summer-rooted cuttings, but parting with all large plants meant few winter flowers, a high price to pay, indeed.

Another problem needed solving. I found that the plants I favor—tender

herbs such as sweet marjoram and rosemary, and scented and fancy-leaved geraniums—did not keep the attractive, stocky form of their summer growth despite the advantage of a house with a wealth of windows facing south. Even in these windows with a southern exposure the hours of weak, winter sun are too short when combined with temperatures in the 60°'s for this group of sun-loving house plants.

I have finally solved the problem within the last three years. During that time I have doubled my growing space and greatly expanded the temperature range. Plants grow better, and it has been possible to add unusual plant material demanding specialized condi-

tions. I have done it within the existing house and with a minimum of expense.

greenhouse windows

The first and most expensive expansion came with the addition of two window greenhouses. Although both were to face south, I aimed at varying temperatures by placing one at the window of a cool, upstairs room. The second window had a radiator at its base, covered by a pebble-filled tray. Despite their dissimilarity, temperatures are almost the same in sunny weather with only a small variation at night.

During the excitement of arranging plants in the window gardens I tried to

group plants with compatible colors and textures as well as to keep cultural needs in mind. Plants with salmon and pink blooms were confined to one window, red flowers to another. Burgundy leaved plants, begonias and wandering Jew among them, placed in the shade of larger plants, made fine accents for the salmon toned window, while golden leaved plants perk up the red blooms. The silver filagree of curry plant, Helichrysym angustifolium, and downy, white leaves of licorice plant, H. petiolatum, are welcome anywhere I can tuck them in. Fancifully cut leaves of the scented geraniums and the rainbow patterns of tricolored geraniums add interest to both windows.

An unusual plant with true blue, winter bloom useful in either window is blue sage, *Eranthemum pulchellum*. Even a few of its five-petaled, phlox-like bloom liven the scene with a sharp contrast, and can be counted on for three long winter months. *Buddleia crispa* has felted, white leaves that are almost continuously topped with panicles of fuzzy buds opening into fragrant, lavender pink flowers, a splendid, drooping plant that blooms when quite small; perfect for a shelf edge.

The window greenhouses, while greatly expanding growing space, didn't solve all my problems. Some plants do not react well to heat that builds up in the confined space of the window garden on spring afternoons while it is yet too cool outside to open roof vents. I also needed a better way to carry over large plants. Even with extra care and frequent turning, my large, tubbed myrtles, rose geranium standard and trained rosemarys looked sadly out of shape by spring.

the light garden

I decided that the answer to some of my problems might be found in cool, unused basement space. As a beginning, two fluorescent fixtures equipped with plant lights served as a light source. Soon, I added two more. Walls were painted white for maximum light reflection. Space under one fixture was reserved for tall growing plants, and benches were constructed under the others.

Temperatures here are usually in the low 50°'s—ideal to carry over slightly tender plants. A dormant con-



Window greenhouse with pink and scented geraniums accompanied with burgundy leaved accents.



Window greenhouse framed by trained pyracantha.

dition is desirable for large plants that must stand at some distance from the lights due to lack of space, so myrtle, a venerable bay tree, and rosemary are left outside as long as possible in the fall to slow growth before being brought in to spend the winter in half light. Sharing these fringes of the lights are resting fuchsia, a ring-tailed jasmine, grown too large for upstairs culture, and the overflow of a large ivy collection. These plants remain healthy throughout the winter and give the room a satisfying, green look even though growth is slow or nonexistent.

I knew that this cool, well-lit area

would work well as a storage area for half hearty perennials and shrubs, but experiments with other plant material has yielded some pleasant surprises. Variegated geraniums, which would do no better than poke along on my windowsill, do exceptionally well here. The ivy geranium 'Sunset,' with pinktinted, green and white leaves, and 'Crocodile,' an ivory-netted, greenleaved beauty, flower most abundantly. Tricolor geraniums 'Skies of Italy' and 'Miss Burdett Coutts' make their most colorful growth here.

With limited space, hanging plants are hard to grow as symmetrical specimens under lights, but weeping, pendulous plants make quite showy, if uneven, growth at bench ends. Fuchsia hemsleyana, a miniature-leaved plant of ferny appearance, but lusty growth, fills its space with a lopsided fountain covered in tiny, pink, drooping bells. One year a peppermint geranium, rescued at the last minute from the frost, usurped almost half a light bank and what seemed like half the room, growing well in much dimmer light than I would have thought possible. I've taken a clue

greenhouse alternatives continued

from this behavior, starting with a smaller plant that grows satisfactorily at a shadowy bench end. 'Snowflake,' another fuzzy, scented geranium of lax growth with a pretty hit or miss leaf variegation, seems to tolerate even less light if combined with cool growing conditions.

I've grown elfin herb, Cuphea hyssopifolia, for years, but this tiny leaved shrub continuously covered in small, magenta flowers has been a delightful surprise under lights, with healthier, more vigorous growth and even more blooms, if that's possible.

cellar door garden

For some time I had been wondering about the feasibility of turning the outside cellar entrance into a minigreenhouse. Eventually a simple, inexpensive plan was devised. Under the inside edge of the 2 x 4's framing the entrance way a railing was attached to support a piece of plexiglass mounted with screws onto a wooden frame that fits snugly into the opening, flush with the top edge of the framing. The plexiglass window is not hinged and can be lifted out to allow access to the cellar. During winter, tape seals the small crack between edging and frame. In a more professional construction this might not be necessary. The original slanting door had been retained. It can be closed during the summer when the mini-greenhouse is not in use. The door also acts as valuable insulation during frigid, winter nights.

The cellar door garden could be classified somewhere between a cold frame and a pit or alpine house. Light is more limited than in a free-standing house; the temperature is higher than in a cold frame. For most of the season night and day temperature varies only a moderate 10° with day readings in the mid-50°'s. While spring sun overheats the window greenhouses alarmingly, the cool basement air keeps temperatures in the cellar door garden at healthy levels. During stretches of extreme cold the thermometer may drop to the low 40°'s.

The growing space is limited, consisting of three steps. Although small, this space has proven to be extremely

useful. The bottom step is perfect for tall standards. There is head space for a hanging plant or two. Since the cellar entrance faces south the slanting, winter sun reaches far into the room providing light for extra plants arranged on the floor beyond the door.

In January and February with limited light and temperatures at their lowest ebb there is little bloom among my usually free blooming geraniums. I depend, rather, on my growing collection of winter blooming, cool condition plants. Primroses seem not to mind the cold. I plan each year to grow at least one kind new to me. This year it is Primula malacoides, the fairy primrose, a floriferous annual in shades of pink and white. The promise of fragrance makes me even more impatient for the tiers of white, farinose buds to open. Boronia megastigma, a delicate, feathery shrub from Australia, is forming buds for the first time this year. The flowers of this temperamental plant are hardly showy, but even a few of the extremely fragrant, chocolate and gold blooms will scent the entire room.

The cellar door garden could be classified somewhere between a cold frame and a pit or alpine house.

My success with a pink flowered, South African heather has encouraged me to search for others. Erica canaliculata, known as Christmas heather, covers itself in bright pink blooms lasting over six weeks. Conradina canescens, a small, twiggy shrub with tiny, needlelike, gray leaves, is a top-notch candidate for topiary. This southern native of sandy, coastal pinelands with herbscented foliage is nearly hardy, but makes a lovely potted plant covering itself with pale pink bloom in late winter. Daphne odora is another small, slow-growing shrub that makes a fine, cool temperature specimen. A small plant raised from a spring cutting has hardly a dozen leaves but three large bud clusters are soon to open into long-lasting, fragrant flowers.

Honeybells, Hermannia verticillata, was a favorite of Victorian conservatory gardeners and is now one of mine. Its scented, yellow bells are strung on gracefully drooping stems among tiny, widely-spaced leaves. It blooms when quite small—with limited space that is a definite plus. Another small basket plant that I admire is the variegated form of a common weed, gill-over-theground, Glechoma hederacea, a small, scented-leaved plant with long, lithe runners. Hermannia and Glechoma prosper under cool conditions.

Among plants held over for the interest they add to the summer garden are several tender salvias. Most are plants of lusty growth that barely survive the winter on hot, crowded windowsills, but grown in cooler conditions they are ornamental additions to the indoor garden, remaining healthy and supplying ample material for spring cuttings. A large plant of *Salvia leucantha*, growing a bit leggy in less than ideal conditions at the fringes of the plant lights still produces a few spikes of velvety, lavender flowers.

The cellar door garden has many uses. It proves to be an ideal place to force bulbs, and in spring it is perfect for acclimatizing tomatoes to cooler conditions before moving them on to the cold frames.

The most satisfying aspect of having several "climates" in which to arrange plants is being able to observe how they respond to differences in environment. A plant that seems to be doing well enough in its present spot may surprise you with a spectacular burst of vibrantly healthy growth when moved to another setting. This response not only increases gardening enjoyment but greatly expands one's knowledge of plant behavior. So if you have been frustrated by limited growing space, lack a variety of environments, and can't afford a greenhouse, I suggest you start investigating your possible greenhouse alternatives.

Barbara Bruno has gardened extensively; her special interests are herb plants (indoor and outdoor), vegetable gardens, perennial borders as well as growing flowers for drying. At present she is working on a book dealing with her gardening experiences with herbs.

A SUNPORCH JUNGLE

by George M. Harding

Several years ago a friend of mine jokingly told me that he was afraid to go into my sunporch because he might be shot at by a sniper hiding in the "jungle." He exaggerates grossly, of course, but, even so, that description still pops up on occasion, particularly from newcomers seeing the room for the first time. Certainly I never planned a "jungle." In fact, it never was really planned; it just evolved.

When I took over the house after my father died nearly 20 years ago I had practically no knowledge of house plants and a small, ersatz group of them to practice on. There was a Dieffenbachia amoena, a Ficus elastica, a Monstera pertusa that had been given to my father, a Schefflera actinophylla, a Philodendron selloum and a P. wendimbe (these last three left over from an orchid exhibit at the Flower Show that I had helped with) and a handful of others. I was traveling a lot on business at the time and the chief requirement that I had for any plant was an ability to survive on benign neglect. They were watered once a week, on Sunday mornings. If they couldn't survive on that, tant pis. Unfortunately two or three of them did not.

As I attained a modicum of seniority in my job and gradually did not have to travel as much or work as many evenings and Saturdays, I began to think about what I wanted to do with the sunporch. My childhood memories were that it was always cold in winter certainly too cold for *my* comfort. My first improvement was to add more insulation and storm windows. Then I decided that light was a problem. Being nothing more than the enclosed side



Plants in hanging baskets continue to grow all winter under fluorescent lights and must be pruned regularly to keep their shape.

porch of an old farmhouse, the room is long and narrow—28 ft. x 9 ft. It spans most of the east side of the house. In winter sunlight floods in, particularly in the southern half, until 2 or 2:30 in the afternoon. But in summer, with two maples arching overhead, everything but bits and pieces of sunlight is blocked out.

The next step was to put in a skylight close to the south end of the room. My reasoning was that in winter it would increase the amount of sunlight still further and in summer even heavily-filtered overhead light would be better than the semi-gloom that I had. I put in the skylight myself, basing its size on the size of some double-thick glass that was readily available. Most of what I know now about flashing and waterproofing (and I know quite a lot) I learned on that skylight. But even with the early leaks it was still a big improvement. No more turning plants in that area to keep them from being lopsided and, even better, a

marked reduction of dropped leaves from insufficient sunlight.

fluorescent lights

The real solution, however, came about two years later. At that time the only location of The Plantarium, the plant store that now has its headquarters in a sumptuously big rooftop greenhouse at 24th and South Streets, was the parlor floor of a brownstone at 1706 Locust Street. I wandered in there one day at lunchtime to admire the plants, but almost immediately became more interested in the ceilingful of fluorescent lights that provided the only light source (except for a separate small solarium at the very back of the building). I realized that, since this was a store, many of the plants did not remain under those light conditions for very long, but some must, and collectively they seemed impressive. It struck me that if fluorescent lights would work in that area with a 10-foot ceiling or more, they ought to work even better on the 81/2-

continued

foot ceiling of my supporch, Bob Scott. owner of The Plantarium, advised me that the longer the fluorescent tube, the more efficient it was in its consumption of electricity. I bought six 8foot double fixtures, the longest made, and installed them in pairs down the length of the ceiling of the sunporch, evenly spaced between the windows and the inside wall. To take care of a darkish area between the skylight and the south windows I later added a 4foot fixture at right angles to the long lights. I also installed a timer so that the lights would be on 14 hours a day, summer and winter, whether I was at home or not.

The first set of tubes were Vitalites. but when they were used up after several years, they were replaced with regular white light tubes, as much because I got a good buy on them as for any other reason. Because of the mix of ample natural light along with the artificial light, particularly from October to April, I have noticed no difference in the reaction of the plants between the two.

Now I finally had the kind of plant room that I had wanted. It was not a full-fledged conservatory, but it was the next best thing. Plants at the north end of the room did almost as well as those directly under the skylight at the south end. As an added plus I could now have hanging pots as well that would not "boom" outside in summer and "bust" inside in winter. But I also discovered something else—that I soon became a plant-adopter. With plenty of space and good growing conditions I began to fall heir to plants that had grown too large for friends' houses or that had to be disposed of for other reasons. In a short space of time a second schefflera came, then a tall Dracena massangeana, then two 4-foot citrus trees that had not bloomed and still haven't. There were smaller plants that came too, including some African violets, about which I have never been very enthusiastic, but which have bloomed happily on the narrow east windowsill above a radiator ever since they arrived.

Nobody would call the group of plants that I have now a horticultural treasure chest. It's more of a grab-bag. Most of them are run-of-the-mill, readily found in any of the plant stores that have proliferated in recent years.

On top of that I have too many duplicates. After all, who needs three scheffleras, no matter how much he may admire the configuration of the leaves? (The third is the result of airlayering one of the trunks of the first clump that was beginning to grow against the ceiling.) Fortunately space militates against me now and, as I divide and take cuttings, I simply don't have room to keep them. Friends and relatives get some of the excess and providentially our local Episcopal church has its annual fund-raising fair

After all, who needs three scheffleras, no matter how much he may admire the configuration of the leaves?

the last week in September, just after I have run out of hooks in the ceiling and windowsills. The plant and garden booth at the fair gets everything that is left.

new plants

Each year now I try to start one or two new or different plants either from seed or cuttings and, as these mature, they will displace many or all of the duplicates and maybe even some of the less special one-of-a-kinds. A hanging basket of Columnea microphylla, started from cuttings I was given three years ago, has a regular spot reserved for it in the south windows all winter and then in early March, when it begins to bloom, it is moved to a "show" location where the cardinal shower of flowers can be enjoyed for the next two months. The first year it bloomed I moved it back and forth between the south window and the "show" location, thinking it needed the direct sunlight to continue to bloom. But last year it stayed in the "show" spot, away from direct sun, and did just as well. It also spent last summer inside under the lights and looks just as healthy for the experience.

In late September a year ago a friend gave me a honeysuckle fuchsia (F. triphylla) that she had no space for. Most of the woody stems were ready to be cut back for the winter, but one latesprouting branch was still thriving and

about to come into bloom. Since I had a spare hook in an out-of-the-way spot I was curious to see how that branch would react to fluorescent light. The result was a lopsided, single-stem fuchsia that bloomed all winter. Encouraged by that I took cuttings from the plant in the spring when new growth started, deliberately kept them in the shade most of the summer so that their blooms were only just forming in late August and now I have a modest-sized, but graceful, fuchsia that bloomed without letup all this past winter. The red was not as intense as it is outside in the sun, but who's to quibble?

Most flowering plants do not get enough light on the floor to perform well, which certainly is not surprising. The one exception I have found so far has been impatiens. During the fall and early winter it may be niggardly with its bloom, but, come January, it gets more and more prolific. (A hanging basket of impatiens, hung perhaps a foot below the lights, does spectacularly.) For a party or some special occasion when I want spots of color against the green, there are always two or three Begonia semperflorens, an Oxalis regnellii or a couple of Cyclamen persicum giganteum blooming in south windows upstairs that can be moved down for a day or two. Last year I tried Primula obconica for the first time, starting the seed outside and then keeping the plants in a south window in a cool guest bedroom until they began to bloom in late February. Granted the results were not what they might have been if I had a greenhouse, but a dozen and a half of the primula grouped together at Easter, along with daffodils, hyacinths and tulips that had been forced in odds and ends of spots (including the attic) looked splendid. This year the P. obconica were joined by P. sinensis fimbriata and they provided color even earlier, coming into bloom in January.

There are also Transvaal daisies (Gerbera jamesonii) started from seed last spring, growing under lights in the cellar not far from the furnace. I don't know whether they will make it into bloom in time to join the primula or not. It may take a year or more of trial and error before I learn what their schedule is, but to me that is just part of the fascination of this random sampling of different plants.



The author picks faded blossoms from Zygocactus truncatus which, he says, has been around the house "forever." The plant spends the fall bud-forming period in a south windowsill in a room that is usually dark at night.

outside

A majority of the plants are moved outside in summer, although some of the big ones are getting harder to maneuver each year. Three of them, two *Philodendron selloum* and the *P. wendimbe* already have too wide a "wingspan" to get through the door and they have to stay in. And I have found that a dozen or more of the hanging pots are better off inside year-round—the columnea, maidenhair ferns, two tripogandras and a *Pellionia pulchra* among them.

When September comes it is like putting together a giant jigsaw puzzle to get everything fitted back together again inside. The biggest pots come in first to their appointed locations, then the medium-sized ones and so on. The hanging plants that have been outside are last and then comes the jockeying around of pots from hook to hook to make sure that nothing is too close to its neighbor or is blocking off too much light. It's at this point that decisions start being made on candidates for the church fair.

I know that even today I probably do not devote as much attention to the plants as they ideally should get. With watering, feeding, cutting off dead leaves and blooms, spraying when absolutely necessary and what not, it

takes an average three hours a week in winter-about all the time I can afford right now. I prefer a cool house (although some friends call it downright cold) and on most days in midwinter the temperature in the sunporch rarely is higher than 62-63°. At night it falls to 54°, sometimes even lower. This range seems acceptable to nearly all the plants. One exception is a hanging pot of Maranta leuconeura erythoneura which would probably like temperatures 10° or more higher. It is not at its best in winter, but does marvelously under the lights the rest of the year. On the other side of the coin a wonderful big potful of Dieffenbachia amoena seems to like its environment and shows its gratitude by putting out blooms at least half the year. They are not much to look at-long green protuberances that are awkward-looking even when they're open-but they are reassuring to see. The Philodendron wend-imbe, even though it stays inside all year and is far below the lights, also blooms regularly. Again its blooms are not much to look at-rather like elongated skunk cabbage blooms-but they are interesting oddities to show visitors.

Individually many of my plants, perhaps even most, are not the specimens they might be, but, grouped together and given the limitations under which they grow, the overall effect is lush. I have to admit that on a winter morning, particularly a Sunday morning, when I can see a bleak sky and snow and ice through every window, it is nice to sit there at the garden table, surrounded by growing plants, having breakfast and reading the papers. It makes whatever time and effort that may be involved seem more than worthwhile.

George Harding dislikes winter intensely. Having a lot of plants around helps him to make it through to spring.

coping with a hot wet

As reported in the PHS *News*, we had an inordinate number of wet days in the spring and summer of 1979. Measurable rain fell on 53 days between May 1 and August 31. By contrast, I remember one year in the last 25 when it rained not a drop in those four months. Which is better? All the frustrations and disasters of excessive moisture notwithstanding, I'll take too much rather than too little.

Not only was it wet, it was hot. In July and August, there were 14 days when the temperature went over 90° and 32 nights when it didn't go below 70°. I sowed lettuce seed three times in midsummer and had no results. Later, I learned from Lois Burpee that lettuce doesn't germinate if the nights are that warm. Occasional exceptions are Salad Bowl and Oak Leaf.

In addition to the extraordinary heat and humidity, we had two recordbreaking cold spells. One, over the 4th of July weekend, when the official night temperature dipped to 54° (July 6) and again during the week of August 12, when it went to 50°. The plants in my garden that were most affected were the tomatoes. The tomato is of tropical origin and requires warm weather and plenty of sunshine for good results. Tomato literature says that 50 hours of 55° or higher temperatures are required for fruit set. Those two cold spells caused most of the flowers on my plants to shrivel and fall. But the cold was not the only inhibiting factor this summer. Tomatoes are also set back by extreme heat. They tend to lose their blossoms if the day temperatures rise much above 90° or the night temperatures don't fall below

75° (Green Scene, Vol. 3, No. 5). Both these limits were exceeded this summer, setting the plants back still more. My first fruits were not harvested until August 5. The varieties that did best for me were, as always, Burpee's Big Girl Hybrid VF and Burpee's VF Hybrid. Pixie did pretty well in a two-gallon black plastic pot.

The second cold spell was so alarming that I carried in three of my favorite tropical plants for four nights running. They were a miniature caladium (see *Green Scene*, Vol. 5, No. 1), a staghorn fern (*Platycerium grande*) with large shields and fronds, and a hanging pot of diminutive *Columnea arguta*. I was sure that sudden cold nights after three weeks of stifling heat would cause them all to respond as though it were early October, by dropping their leaves in preparation for winter dormancy.

Here are some other particularly vexing problems I encountered:

Slugs. I saw one that was nearly three inches long. The constant moisture on the ground, the pots and the leaves made it a gala summer for these slimy creatures which, as far as I know, do nothing helpful. I pour Slugit liquid on the ground around petunias, begonias and other soft herbaceous plants. I put it (diluted, 2 tbs. per gallon of water) right in the pots of containergrown plants. Since it's a poisonous chemical (20% metaldehyde), I don't use it near vegetables. Jerome Eaton and Carroll Calkins in their book How to Garden (Macmillan, N.Y., 1973) suggest slug bait (solid or liquid) in an empty coffee can laid on its side. This seems a good idea because, at least, the rain won't wash it away.

Imported cabbage worm. I don't have full sun or much space, so I seldom bother with cabbage, but this year I couldn't resist trying Morden's Dwarf Midget. It grew well in an 18-in. cedar tub and has six miniature heads ready

to go to the Harvest Show (tub and all). The challenge comes from the imported cabbage worm, an elusive pest, which I've yet to lay eyes on in the worm stage. It makes its presence known by chewing holes in mature leaves of cabbage, broccoli, and Brussels sprouts. Ortho Tomato-Vegetable Dust provides pretty good control. This is a good all around pesticide for vegetables. It contains captan (a fungicide that is supposed to be effective against some fusarium diseases) and methoxychlor and rotenone (effective against most insects in their young, soft stages). In normally dry weather it should be applied at about 10-day intervals, the last application at least three days before harvesting.

White fly. This is the most persistent pest in my garden, infesting a wide variety of plants, particularly azaleas and tomatoes. You can't have white fly without knowing it. The tiny creatures rise in clouds when anything disturbs their dwelling place, and they can also be detected by the black sooty coating that appears on the leaves of infested plants. This is actually a fungus. It grows in the flies' excretions, which is called honeydew. White fly can be controlled by SBP resmethrin, a synthetic pyrethroid also known as SBP 1382, if you follow the directions meticulously. Spray once a week for four weeks in the evening when the temperature is between 50° and 72°. However, this product is not labelled for vegetables. On them I use Pratt's Red Arrow, which contains natural pyrethrins. It can be applied up to 24 hours before harvest. Red Arrow has little or no residual action. You must spray every three days in hot weather for up to four weeks. As an alternative, if you're growing vegetables in con-

SUMMUL Syby Ernesta D. Ballard





tainers, try the vacuum cleaner. It is quite effective.

Mildew. These fungi appear mostly on deciduous azaleas, phlox, and begonias, and I spray against them relentlessly. Benomyl 50W will usually prevent mildew and will even cure it if it's just starting, but leaves damaged over more than 10% of their surface never recover. I also use captan 5% WP and Phaltan (folpet), usually a different one each week. This year I had it pretty well under control until the August cold snap. When the temperature returned to summer normal, mildew was everywhere.

During the summer, the Society's Hotline, WA 2-8043, was besieged with distress calls about fungus diseases on fruit trees and other deciduous trees and shrubs. In most cases the Hotline operators suggested spraying with captan 5% WP, and they always recommend collecting the infected leaves and putting them in the trash, not the compost.

The only fungus disease that hit our garden was Elm Black Spot, which destroyed the new growth of our Catlin elm bonsai. Ann Rhodes, the pathologist at the Morris Arboretum, diagnosed it and suggested spraying with ferbam. It did the trick.

There were some redeeming features to this wet, hot summer. Our lawn didn't turn brown; our moss garden was lush; most evergreens did well, and potted tropicals such as various Ficus species, Cycad revoluta, Dicksonia tree fern, and Medinilla magnifica gave us an idea of how they might grow if we lived in a rain forest, their native habitat.

Ernesta D. Ballard is president of PHS.

The flowers were first painted on the coasters and then detailed botanical drawings made on top of the flowers with an indelible pen.

Denim pillows: fanciful floral shaped leather applique and machine stitching. Made by Jane Lennon.







by Joanna McQ. Reed

Positive Thoughts While Weeding

In the dog days of August when crab grass, sorrel, smartweed, amaranth and purslane are unconditionally winning the ever raging battle between weed and weeder, even the most ardent gardener's ardor is apt to wane.

Dreams of rearranging favorite specimens to upgrade flower borders, adding bulbs with a more lavish hand than would ever be economically or even physically feasible, or merely transforming a hopeless quagmire into a glorious bog garden, are little comfort when struggling to stem the green tide with the sun and humidity beating down.

To counteract this annual dilemma I often plan projects for Christmas giving; it puts the focus on a cooler time. The plants and insects surrounding me become inspirations. Since a minimum of thought is necessary for the job of weeding, it's a good time to plan simple or elaborate gifts using nature's inspiration.

Most of us, by now, have collected dried materials to convert into wreaths,

swags, plaques, Christmas tree ornaments and even miniscule trees. Happily this work can be done well in advance of the holiday season. Check plant material now to be used later in pungently fresh wreaths. Judicious pruning during the early summer months will have paid dividends when the greens are cut for use in December. While you are cutting, look for good places for next spring to add plants with striking texture or variegated foliage for future gift making.

two wreaths — ivy and scented

Two easily made living wreaths are constructed as follows:

1. Set miniature leaved ivy plants with longish trailers into a box wreath frame stuffed with wet sphagnum moss. Use at least eight or ten plants; arrange the trailers to cover as much of the moss surface as possible. Spiral thin wire about frame, moss and ivy to hold all in place. Pinch out all tip ends to encourage fullness. Keep pinching, pinning down ends, fertilizing and watering

regularly until Christmas. Sturdy plants are essential. If rooting your own cuttings start early in summer for success.

2. Again pack a box wreath frame, this time with oasis (a great use for the leftover bits and pieces we all have). soak thoroughly. Insert snippets of various greens and greys such as santolina, teucrium, lavender, dwarf sage, rosemary, sweet myrtle or English box. They will make a pleasingly fragrant wreath, best used flat as a table decoration. Made only a day or two before given, it will hold throughout the holiday season if kept consistently moist. Some of the snippets might even root, a nice bonus. In the future, when planning such a wreath cut back all plants that you intend to use by mid-August to promote full branch tips for the winter harvest. Harden the snippets in water for a day or two before using them in the wreath as you would any cut flower.

seed and plant catalogs

A yield of countless gifts can be

Dandelion: sheet plastic instead of a brass plate was used for this etching done by Gar Reed.



Cork coasters: The flowers were first painted on the coasters and then detailed botanical drawings made on top of the flowers with an indelible pen. Made by Franziska Hecht.



Balsam pillows: Draw embroidery design on paper; transfer to cloth using a sheet of dressmaker carbon paper. Go over design with an indelible pen as the carbon image will smudge before embroidery is complete. Cut cardboard or paper templates (shapes) for geometric trees on appliqued pillow. Draw around each one with a pencil on each cloth—the one for the pillow and the one for the trees. Cut ¼ in. outside of the line for the hem to be turned under when sewing pieces in place on marked pillow, overlap each as necessary according to design.



Thinking About Christmas

harvested from outdated seed and plant catalogs. Used for decoupage they can beautify covers for garden record books, trays, assorted boxes, cannisters, lamps or simply jar lids for jams, jellies, dried herbs for cooking or seeds carefully collected and bottled to be planted for next summer's treasures. What fun for a child to paste pictures of Burpee or Harris vegetables on an empty Crisco or instant ice tea can, then fill it with his or her own cutout or molded cookies shaped like carrots, tomatoes, peppers or eggplants, iced or plain.

Along with a pot or two of forced hardy bulbs such as *Narcissus* 'Tete a Tete' or 'Muscari,' a promissory note for a choice plant or two to be delivered in spring, give a file box enhanced by horticultural decoupage. Fill a separate file card for each gift plant with a picture, and note names (botanical and common), cultural needs and statistics, idiosyncrasies, origin, use if any, date of introduction or discovery, etc. Don't get carried away in a flush of enthusi-

asm and forget to leave space for future records. Cards can be grouped by use, such as rock garden, woods, border, meadow, etc. Such a file with notes about quantity, success, location will be the nucleus for valuable records and perhaps fewer bulbs will be unintentionally destroyed out of season by shovel and trowel.

Cards listing recommended books (old or new), their authors and publishers would be a helpful and useful addition as would the names and addresses of nurseries handling hard-to-find plant materials. The ubiquitous seed catalogs are also good resource material for painters and embroiderers, neophyte or expert. Some years ago after painting a number of trays with stylized holly wreaths, I used up the leftover red and green paint and switched to painting a collection of viburnums and cotoneasters on some recycled canape trays. The botanical source was Wayside's catalog. The freehand by-product was nicer than the initial holly project.

Often people will say to me, "I wish I could do that," referring either to the drawing or the embroidery—my wish is that they would only try. The results can be surprisingly satisfying. Grandma Moses like other primitive painters did just that, try. The charm of her work and yours lies in its unique quality, just as the charm of children's art in any form is its freshness. The joy of creating a gift will give your effort loving purpose and erase traces of reluctance.

Observe fresh flowers, leaves, fruits and vegetables or their counterparts in the colorful catalogs. The forms and colors are already familiar to the gardener in you. Look closely for design qualities to be used for geometric adaptations, light and airy line drawings, bold color splashes, neatly repeated floral motifs as well as realistic representations according to your whims and personality. These can be planted on the same kind of tin or wooden objects listed above for decoupage.

continued

Nondescript pieces of furniture can be amusing but it's best to start with the smaller items.

for young persons and not so young

Starting small is also a good plan for embroidery projects; leave tablecloths, bed linens, quilts, evening skirts or men's vests to the experienced. Start with the lowly pot holders, guest towels, pin cushions, sachets and doilies. Use the best materials, however; a flimsy piece of fabric or needlepoint canvas will lead to certain disaster. For a favorite child, applique or embroider a flower, fruit or vegetable on dress, jeans or tee shirt. Or go all the way and make a costume. What fun to climb into a flower or pumpkin disguisepatterns are available but can be elaborated on to your heart's content.

Paint an orange tree on a piece of plywood or heavy cardboard with a number of 5-in. round holes cut into the upper part. Give along with a bag of empty plastic lemon and lime

squeeze bottles to be tossed through the holes. If names are necessary call it "Oranges, Lemons and Limes."

illustrations by author

Fashion fruit, flower and vegetable bean bags simply and colorfully from felt. For the slightly older child add a square target painted or embroidered as a garden plot. The object is to toss the tomato on its rack, the pumpkin into its patch and the lima beans on its pole. Sew a loop at each corner, gather the four loops together and presto! the garden plot turns into a storage bag.

For young and old alike balsam pillows were once an all-time favorite. Give it a contemporary look with the conical shape of *Abies balsamea* appliqued in repeated but diminishing sizes. Work a bonsai *Abies* in crewel wool, or embroider a specimen with a simple outline stitch in a manner reminiscent of the woodcuts in early herbals.

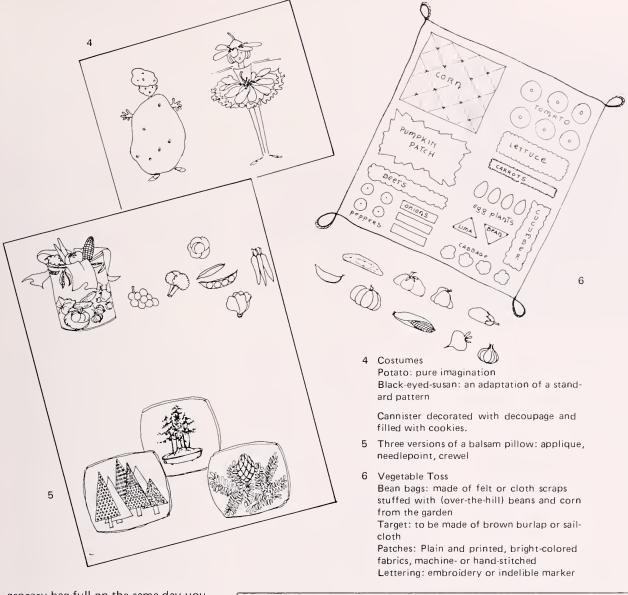
Obviously it was easy for me to be carried away into happy flights of fancy as I pulled those weeds. One idea spawns another, some so complex they

will never progress beyond the realms of a fertile imagination. In addition to the imaginative gifts dozens of traditional gift ideas are possible: vinegars, chutneys, pesto, (the jams and jellies were mentioned earlier), home canned and brandied fruits, hardly recognizable kin of the tins of fruit on store shelves. Also breads, cakes and cookies made from surplus zucchini, carrots and pumpkin are great if you have ample freezer space.

pressed flower arrangements

We can't all be blue ribbon winners with our pressed flower arrangements but their colorful and delicate charm are naturally enticing, and such a gift is certain to be welcomed.

Flower petals and leaves, collected and dried, are the bases for sachets and potpourri (find a good recipe unless you are already an expert). Braided lavender sticks or scented tea cosies are extra ways of using the fragrant herbs. If you have an ample source of rose petals and can collect at least one



grocery bag full on the same day you might try making rose beads. Through repeated daily grindings the petals will be turned into a papier-maché consistency. This paste should then be pressed into a bead shape around a wire and allowed to dry until firm and hard. The color will be brown but the fragrance is long-lived.

Now I leave you to your own musings as you stem your own greedy tide knowing that we agree; planning gifts for the people we love and the memories those thoughts bring back is nicer than concentrating on the hatefulness of weeds on a hot and muggy Delaware Valley summer day.

Of herself, Joanna McQ. Reed writes: "Working in the diverse areas of our garden and woods, I feel close to the plantsmen who discovered or introduced these treasures, to the friends who have shared their plants, to the gardeners who have encouraged us by visiting our garden and lastly the plants that lend themselves to so many landscape situations and design inspirations."

DECOUPAGE

The dictionary defines decoupage as "the art, technique or method of decorating something with paper cutouts." It most certainly is art when done by a skilled person.

Here's how it's done: roughly cut the desired pictures from greeting cards, wrapping paper, wallpaper, magazines or catalogs. Carefully trim to the exact edges removing every trace of background color. If it is necessary to cut the design to remove isolated bits of background make cuts along the line of a petal or where a stem joins a flower so they will be inconspicuous. After cutting a number of images lay them on the object to be decorated, pushing them around until you are pleased with the design, then carefully glue each piece into place. If there is an overlap be sure to glue the underneath piece first. Extra glue may always be applied with toothpicks where needed. Press with fingers or cloth to remove air bubbles beneath the cutouts and let dry. An antique glaze may be added at this stage; it will soften the cut

edges and add a professional touch. They are now available, ready mixed in a variety of shades, at paint and hardware stores. Follow the directions on the can. For the final finish use either polyure-thane or outdoor varnish. They both come in a flat or glossy finish. If using varnish sand lightly between each coat using extra fine paper. The design could be a single well-placed flower or a complicated arrangement cut from a variety of sources. Once you have tried your hand at decoupage or pasting paper pieces you will find yourself saving scores of clippings, cards, etc., for future use.

As an experiment I substituted pressed dried plant material for the paper cutouts. The effect was good but in time the color faded and was disappointing. However, it eventually bleached out to a subtle sophisticated monochromatic effect. When working with plant material I would suggest applying the antique glaze before pasting the plant forms. I would also recommend not using the plant material for trays, table surfaces, or outdoor pieces.

J. McQ. R.

A tile from Mercer's Moravian Pottery and Tile Works, depicting a reaper using a scythe before the advent of machinery.



Henry C. Mercer: Naturalist Extraordinary

by Helen H. Gemmill

When the members of the Garden Club of Philadelphia invited Henry Mercer of Doylestown to speak to them in 1914, they could hardly have anticipated his flight of fancy, entitled *Time's Gardens*. He discussed three "marvelous gardens" that stood out in his imagination.

The first was a composite of the overgrown ruins of Europe's ancient abbeys and feudal castles "where the dust of ages has formed a thick soil, upon which trees wave their green plumes, and scented flowers bloom without human help or care."

Mercer admitted it would be "wildly extravagant" to imitate a place like that "where half the beauty of the scene consists in its decay. Yet," he said prophetically, "roof gardens are within the range of our effort, though as we know them, flimsy make-shifts . . . where ceilings supported upon iron beams form flat terraces, upon which flower pots requiring continual attention and watering, are placed in summer, to be removed in winter.

"The real house-top garden with real earth, and perennial trees and flowers remains to be built," he concluded. He saw no reason why "modern" building processes, employing reinforced concrete, could not construct a roof garden supporting ten or more feet of earth—"enough to hold the required moisture for the largest forest trees without human attention."

His second garden was even more visionary: the product of the Indian Mound Builders. He described an Indian Mound he had seen in Ohio: "There, slowly, impressively, as if creeping out of green shadows, by degrees came the

picture in low relief and as part of the earth itself . . . primitive, rude, aweinspiring, I saw in colossal outline the Storm Eagle or Thunder Bird of the North American Indians."

He wondered why landscape architects, "with masses of excavated earth at their disposal, should not at times have beautified their work with the shape of some bird, animal, plant... thus imperishably marked upon the garden sward."

His third "garden" even he admitted to the undoubtedly astonished club members was inimitable: a cave he had explored in Yucatan, when he was Curator of Prehistoric Archeology at the University Museum in the 1890s. The cave was especially memorable because of an unusual opening in the rock that permitted the entrance of water, light, and air, creating an underground "floral paradise." These were "Time's Gardens."

pet hate

One of his pet hates was the stylized pruning of trees. "I remember a pollard willow in one of Albrecht Durer's engravings," he once wrote. "The desire to compress the outlines of all masses of leafage into ideal globular form resembling a cabbage spr[a]ng from a wave of French influence which pervaded Europe about the time of Frederick the Great."

In another unprepossessing but engaging pamphlet titled *The Trees of Doylestown* he bemoaned the use of street trees as hitching posts, "blighted by the teeth of horses," while others were "vivisected when used as stays for trolley or telegraph wires or electro-

cuted by the charged wires of electric lights."

He then describes 87 specimen trees found in the town, incorporating a mix of literary, folkloric, artistic, and historical allusions strung together with hit-or-miss punctuation. Consider weeping willow (Salix babylonica): "Once seen, whether by light of the sun or of the moon, this ghostly tree with its incomparable down streaming of slender leafage can never be forgotten. The ancient forests of America never saw it, but thoughts of romance have followed it from Asia, its original home to Europe, and thence to the New World. Its figure has been carved upon tombs and painted in cobalt on Canton china to illustrate the Chinese story of the runaway lovers. It has been planted in cemeteries and parks, by men, who in spite of its worthless wood, valued it for its matchless beauty. The fancies of Alexander Pope at Twickenham and the memories of Napoleon at St. Helena have lived in its long shadows, and it has heard the song of divine musicians when, according to Psalms 1-37 they hung their harps upon it by the waters of Babylon."

In lengthy sentences he describes a black walnut (Juglans nigra) in Court House Park in Doylestown: "...[Also] look for it still in Solebury or Bedminster where the farmer, though a destroyer of trees, loved to plant it 100 years ago. See it still by the old barnyard wall, where generations of geese have cropped the grass and paddled in the shady mud, where squirrels and 'ground hackies' have made their winter store in the eaves of the rotting spring house—and where boys with

stained hands and sore mouths have Indian-like, pounded the iron-bound nuts. There old women have boiled with vitriol the pungent husks to dye Lindsey Woolsey brown, made sour pickles of the young nuts, or as a safeguard against thunder, gathered in summer the aromatic leaves, vying, in their exquisite perfume, with the Australian Eucalyptus."

Only Mercer could sing such paeons for a wild cherry (Prunus serotina): "Keep an underfed cat in May and cut down wild cherry trees if you would drive away and destroy the Blue Birds, Robins, Cedar Birds, Meadow Larks. . . . Though as improvers of street fronts or vendors of town lots, with arms full of nursery bought Maple trees, we cut down this bird's tree; though the farmer, classing the slender seedling with poison ivy, cow bane, or bramble, lays waste with fire and salt the songsters' paradise by the roadside, it is hard work to exterminate these favorites of nature, . . . whose leaves come out a second time in late Summer after armies of Caterpillars have devoured them."

His commentary on the Seckel pear is especially worth noting: "Because this ancient Doylestown tree... was probably planted about 1806, it is reasonable to suppose that it was produced by direct of nearly related graft-

ing, from the original tree about 13 years before Doctor Hosack introduced the Seckel Pear to Europe, by presenting 18 plants of it to the London Horticultural Society, on June 5, 1819. . . . [It] sprung up by chance from a European stock about 1760, in the rich mud near the confluence of the Delaware and Schuylkill rivers, about one mile south of Point Breeze Park. There the original tree, photographed in 1880, blew down in 1905."

He spoke with conviction about the Seckel pear. In 1909 he and a friend had set off from Rittenhouse Square by trolley car to find the stump. Battling a stinging March wind, they crossed the muddy plain that is now part of the airport. Armed with old and new maps, and a wealth of advance research, they came to a dilapidated old house, near which stood the half-submerged stump of the venerable tree. Mercer broke off a piece for his museum, and prowled in vain for stove plates inside the old dwelling.

Approaching darkness drove them back to the trolley car, but several weeks later they returned with camera and pruning knives, and took cuttings from a tree nearby, which was said to have been grafted from the original. Dr. Mercer transported his cutting back to Fonthill, where he grafted it onto a Keiffer.

reinforced concrete

It is not surprising to us that Mercer was talking about reinforced concrete and gardening in the same breath as far back as 1914. Mercer (1856-1930) has long been famous for his three concrete "castles" in Doylestown: the Mercer Museum; his home, "Fonthill"; and the Moravian Pottery and Tile Works—all now open to the public. His collection of early Americana and his historical publications have received wide acclaim. Less well known, however, is the fact that he was also a passionate naturalist.

His was an inherited interest. His father, William R. Mercer, Sr., had an abiding interest in trees, and planted his estate, "Aldie," with unusual specimens. His mother loved flowers, and the Mercer gardener's floral displays at the Doylestown Fair in the 1870s excited much comment. Even Henry's younger brother, William, Jr. (who had studied sculpture under Charles Grafly), had a related interest: in a Bavarianstyle studio on the Aldie estate, he turned out concrete garden ornaments that can still be found throughout the Delaware Valley.

Part of the estate had a garden in the Italian style (described by the Bush-Browns in *Portraits of Philadelphia Gardens*, 1929) featuring an allée of pleached arborvitae, pergolas, fountains,

continued



An original sketch by Mercer, used as the logo for the Doylestown Nature Club.



Fonthill



The Moravian Pottery and Tile Works

a vaulted loggia, and marble statuary. This clipped formality was not Henry Mercer's cup of tea. His travels had exposed him to the natural beauty of the Americas, and the picturesque scenery of abandoned Old World civilizations; so when he built "Fonthill" in 1908, his only concession to formality was two rows of plane trees lining the entrance driveway. Wild flowers were encouraged. Seeds and seedlings of trees were planted at random around the grounds. There was never any foundation planting, for he was concerned that the dampness would injure his collection of books and engravings.

His preoccupation with nature and man's environmental destructiveness was reflected in his writings. In the 1890s he was an editor of *American Naturalist*. Toward the end of the century he published an irate pamphlet, *Fashion's Holocaust*, for the Audubon Society, taking deadly aim at the use of birds' feathers—especially egrets—in women's hats. "Count the herons on Chestnut Street if you can. Nine warblers (wings, legs, and heads) on one woman's hat. Two canary birds on the cap of a baby."

In the 1920s Dr. Mercer conceived the idea of turning part of his Fonthill estate into an arboretum. With the help of the Doylestown Nature Club, he began to collect seeds and seedlings of North American trees, "especially those which thrive and grow well in this region."

With his customary scientific thoroughness, he drew a chart, showing the location of the plantings, as well as a record of where they came from. On October 16, 1929, for example, two seedlings were dug up "under the great willow oak at Bristol, 1½ miles north on Langhorne Turnpike left side going North...not marked on chart as all may die."

A few days later: "2 trees of osage orange and 5 fruits given by David Burpee [the seedsman] . . . Also 2 seeds of buttonwood tree planted by me H. C. Mercer in the Cloister Courtyard at Durnstein on the Danube, Upper Austria in 1883, cut down about 1927."

About the same time at his adjacent pottery he designed "everlasting markers" for trees, which spell out both the common and botanical name. Before the tiles were fired, holes were gouged in each corner, to attach chicken wire that could be loosened as the tree trunk grew.

Unfortunately the arboretum never materialized, due to lack of funds after

his death, though the "natural forest" that he had encouraged to spring up, is still there.

Mercer's knowledgeable interest in native Pennsylvania flora and fauna is today best illustrated in the glowing tile floor that he designed for the Capitol in Harrisburg at the beginning of this century. In a series of more than 400 mosaics he depicted not only the history of the state-Indian rock carvings, Penn's Treaty, Washington Crossing the Delaware, Franklin and his kite, the Battle of Gettysburg, oil wells near Pittsburgh-but also its natural environment. In the preface to his Guide Book to the Tiled Pavement he wrote: "To preserve continually the memory of the forest from which the State takes its name, the leaves of trees and the forms of reptiles, birds and animals frequently appear."

The floor was cleaned and restored not long ago, and remains, especially for Pennsylvanians, a unique visual depiction of their heritage—as well as a memorial to one of the state's gifted native sons.

Helen M. Gemmill is a member of the board of trustees of the Bucks County Historical Society, which owns and operates the Mercer Museum and Fonthill. She is also on the board of the Historical Society of Pennsylvania.





neomarica gracilis

A friend had pots and pots of *Neomarica;* she gave me one. I took it home, put it on a sunny southern windowsill, and then sort of forgot about it. Except for an occasional watering, it was neglected. But it grew and lo and behold, one day near the end of a sword-shaped leaf there was a flower bud. Several days later I looked again; what had been the promise of something pretty was a shrivelled up brown thing.

I found out why. The apostle plant

(so named because 12 blades are needed before a flower will develop) flowers for one day only. It is a day worth watching for because the flower, small, iris-like and slightly iridescent blue and white, is beautiful and surprisingly fragrant. Then, if the point on the blade where the flower was is pinned to a pot of soil, or allowed to bend over and land conveniently on a pebble tray, a new plant will appear.

Obviously, Neomarica is an easy plant to grow. Since my mother plant has blossomed many times over the years (and I have enjoyed many a birth) I have lots of plants. Some grow in sunny spots, others in a shaded kitchen window. The fans (another common name-house iris) are flat and twodimensional so they don't require a deep windowsill. They thrive outside in the summer in light shade. Older plants that have lived several years in one pot may benefit from periodic root division, another way to add to your collection. There will always be some to give away.

Try one. It's one of those sure-fire house plants that's guaranteed to please.

Betsy Shuman

Betsy Shuman is a graduate of the Horticulture Program at Temple University, Ambler Campus.

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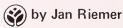
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Jean Byrne, Editor

Lady Belle:

OUR ANTHROPOMORPHIC CHRISTMAS CACTUS



In spite of my indifference to the cactus family, I was somewhat obligated to show a certain amount of respect to the 80-year-old Christmas cactus that we had just inherited. Not only was it a senior plant, but a "talked about" member of our family that had originally been adopted by my grandmother. After Nana departed, the mature plant, christened Lady Belle (which was much easier to pronounce than the botanical name, Schlumbergera bridgesii), found a new home with my mother. It seemed to go into a state of mourning and refused to put forth the spectacular show of Christmas blossoms that had been as traditional as the season itself.

It displayed no ingratiating characteristics to impress my youthful mind, and I never became attached to the plant. But Mom hung in there, and after I had moved to Pennsylvania, she wrote saying Lady Belle had begun to show off again by producing over 100 intense, cerise-pink blossoms, just in time for their annual Christmas party. The plant continued this pattern for many years, after having been placed on a cool sun porch.

Upon joining us last November, it began balking again and produced only a few isolated blossoms. I began to consider that the plant wasn't being contrary. Maybe it wasn't being humored enough culturally. It was then my research began.

The plant was indeed potbound, and I was tempted to have it repotted professionally until I read that repotting is seldom necessary as the Christmas cactus blooms better under crowded conditions. The idea would have to be filed as a last resort, and at least wait until the recommended time to transplant in April.

It would appear that after these many years, the soil mixture was probably a bit tired, but as long as it wasn't going to be repotted using a well mixed combination of one part each of fertile garden loam, coarse sand, rotted manure or compost, and leafmold, perhaps a tonic might stimulate some activity, so I gave it the same treatment that all



my indoor plants receive—used tea leaves and room temperature tea brew.

Next, I transferred Lady Belle from a too-warm living room to a southeast exposure in our 62° dining room; very soon buds began to form on many of the flat, woody stem tips. Careful watering was essential during this critical stage of blossom development. Too much water would cause bud-drop. Too little would stint growth, although it's always prudent to grow the plant on the dry, rather than wet side. We must have been doing something right because in February, Lady Belle showered the third generation owners with a profusion of exotic blossoms that lasted about six weeks. Once it was in full bloom, I gradually decreased the amount of water, allowing only enough to keep the stems plump and

After all danger of frost, Lady Belle was placed outdoors on the north side of the house where it remained for the summer amongst shrubs and trees that received only filtered sunlight. (Some horticulturists believe that direct sunlight is also acceptable.)

Once the new growth started at the tips, I began propagation by cutting pieces of branches, two or three segments long at a joint where aerial roots are apparent, and placed them in water until a healthy root system had developed. Then I followed the above directions for soil requirements. B'ossoming the first year is not unlikely.

In mid-September, before frost, we bring the plant indoors and follow professional instructions for Christmas cactus culture.

Because Christmas cactuses never seem to require a rest period, one must

be forced upon them. Furthermore, dormancy is considered the best method for developing buds annually. An enforced rest period in this plant's life is managed by withholding water and nutrients. And the Christmas cactus should be placed in a dark room for the month of October with temperatures ranging between 50° and 55°. Any artificial light will inhibit growth.

Since Christmas cactuses are a "short day plant," they won't set blossoms when the days are long or temperatures high. When they emerge from dormancy in November the buds will begin to form. During the active growing season resume watering, letting it run freely through the soil. Begin gradually, watering a little at a time, about once a week, and when new growth appears at the end of the old tip, increase watering, but when the buds begin to form, immediately reduce the amount of water.

As growth progresses, gradually expose the plant to full sun, and apply a weak solution of balanced soluble fertilizer every two weeks—or until the buds begin to show color at which time the fertilizing should be discontinued.

As I undertook to write about this plant, I had hoped there might be some intriguing legend about the Christmas cactus, but each query led to a dead end. Perhaps with a bit of imagination, however, our own fable can be developed. I shall leave such an enterprise to our son who will inherit the grand old plant when it's time for it to move on to the fourth generation.

Jan Riemer is a frequent contributor to *Green Scene*.

Landscaping in a Heterogeneous Community

an opportunity to deal with reality while assimilating theory



In college many students find themselves long on theory and short on practical experience. As a student of horticulture and landscape design, I was no exception to that dilemma and was delighted when an opportunity arose midway in my graduate studies at the University of Delaware, to gain some practical experience in landscape design.

My chance came through Stevenson W. Fletcher, Jr., a landscape designer who is consultant landscape architect to various colleges and retirement communities, such as Haverford and Bryn Mawr colleges, Foulkeways and Kendal. In 1976 Steve was asked to landscape Crosslands, a new retirement community adjacent to Kendal, two miles north of Kennett Square, Pa. In an attempt to avoid some of the problems they had run into at Kendal, the Kendal/ Crosslands management decided to ask those residents with gardens surrounding their apartments to submit a garden plan for Steve Fletcher's approval. The plans were not supposed to be elaborate, but at least Steve would be able to veto plantings that might become expensive safety hazards within a few years. The management informed prospective residents of the required procedure, made available blank plans for the various types of apartments, and gave the residents several options: they could do the plan themselves, they could have it done by a local nursery or landscape designer, or they could call me for help.

Thanks to Steve and the management at Crosslands, here was a chance for me to deal with real clients instead of the imaginary homeowners we had considered in landscaping classes at Temple University, and I could carry designs through from concept to planting. Although the size of the gardens (150-500 sq. ft.) indicated the landscaping would hardly emulate the style of Capability Brown, Humphrey Repton, or Frederick Law Olmsted, at least it was a start and it got me away from the traditional student problem of

rarely seeing a design installed.

Nervously I waited for my first client to call. In July, 1977 the call finally came, and we met at Crosslands. As the place was still under construction, the area resembled a bomb site and we both had difficulty imagining the finished product. The apartment faced north and the first plan I produced did not impress my client: she

Planning and tending a garden can play an important role in the lives of older people: as they put the garden to bed in the fall they have an additional objective on the horizon—to open it up again next spring.

didn't fully appreciate the necessity for shade-loving plants. On reflection I realized my first attempt was unimaginative. Gradually we reworked the plan to our mutual satisfaction.

Since that first attempt I have provided landscaping advice to several Crosslands residents. The sites are all similar, but each situation proved a unique challenge. Residents with health limitations and those with many other interests wanted gardens with the smallest possible maintenance requirements. Some wanted to create a miniarboretum within their tiny plot. Others wanted spring gardens as they still own summer cottages and planned to be away from June until October. Several were coming from southern climates and had to readjust their thinking to accommodate only plants hardy in Zone 6. With many of the residents there was an understandable urgency to get their gardens planted. Some joked about their prospects for longevity, others were distressed by the bareness of a recently-completed construction site. They had suffered an enormous wrench in leaving the homes and gardens they had nurtured for so long, and felt that a growing garden would

contribute toward their feeling more settled.

the pet problem

One of the more interesting problems was presented to me by a woman from Connecticut. Her household included two West Highland terriers that she wished to keep within her garden. At home a simple fence had solved this problem. At Crosslands the management stipulated no fences in front of the apartment buildings in case quick access was necessary in an emergency.

Throughout August the owner of the terriers and I developed a close relationship over the telephone and plans were posted to and from Connecticut. No fence-well that seemed to mean no dogs-and she was not coming to Crosslands without them. The alternative suggestion was a wooden fence on the two sides and a barberry hedge across the front of the apartment. She suggested three rows of William Penn barberry. The nurseryman and I thought two rows would be sufficient and suggested using Mentor barberry, which is more rigid than William Penn, Maggie and Robert moved in and within 24 hours had proved us wrong and their mistress right—we added a third row of barberry. Having solved the dog problem, my friend from Connecticut has made a delightful garden by enlarging her concrete patio with a flagstone terrace and planting several large shade trees in the area outside the apartment. Two large arborvitae also help break the severe lines of the two-story building.

For those residents who planned to remain at Crosslands throughout the summer, the openness of the site and the lack of shade trees around the buildings presented a problem. The dog lover from Connecticut solved this with wooden shades, another client erected a wooden awning with slatted roof. Many hours were spent contemplating the width of the slats and the distance between each one, trying to

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Landscaping continued



Garden edged with boxwood.

ensure shade in summer on the terrace, and sufficient light in the apartment in winter. In her garden we also included a raised brick planter with a flagstone cap to increase the terrace seating capacity to accommodate visitors. When this gardener first called I was happy to hear an English voice on the other end of the telephone. Despite the difficult climatic conditions and soil problems at Crosslands, we both have ridiculous longings for an elaborate perennial border in her little garden.

Two other residents have come to Crosslands after living and working for many years in New York City. The experience of having a garden is totally new to them, I don't think house plants were even part of the scene in their New York apartment. They were, however, very definite in their wishes for the garden: nothing was to obstruct the magnificent south-facing view they have over the wooded valley that joins Crosslands to Kendal; the shrubs were to have berries to attract birds; they wished at least one forsythia plant to be incorporated into the design, and space to plant spring bulbs. For the first time they planned to enjoy spring at their own front door. With no previous gardening experience, this couple arrived at Crosslands without gardening tools, and once we had planted the garden they sought my advice on basic gardening books and the tools they would need to maintain the garden. A hose, a pair of pruning shears, a trowel, and a weed scratcher seemed sufficient to get them through the first year.



The longing for a perennial border is satisfied in spite of climatic conditions and soil problems.

accommodating impulse

Another client, this time a gentleman from Baltimore, provided me with hours of interest and amusement in the spring of that year. Unlike the others he was in no hurry. We first talked in October and he assured me he could wait until spring. During that discussion he told me he didn't know much about horticulture and would leave the plant selection up to me. He did mention that he would prefer evergreens to deciduous plants and was not concerned with having a colorful garden. When spring came we discussed the proposed plan, changed a few things, and I set out to find the necessary plants in local nurseries. No sooner had the plan gone out to bid than the man from Baltimore called with the news that he had made a small purchase that he wanted me to include in the plan. The small purchase turned out to be 250 3-in, pots of Kingsville dwarf boxwood that he had found irresistible during a trip to Henry Hohman's Kingsville nursery in Baltimore. Between us we laughed over his indulgence and decided that we would edge the whole garden with several rows of boxwood. Some edge their gardens with marigolds, others with dwarf box.

Before the nurserymen could install the rest of the plants, the compulsive shopper had purchased two upright junipers (clipped in such interesting shapes that we christened them the worms), a weeping spruce, and another 64 dwarf conifers of uncertain name from the Hohman nursery. Sadly for him, but luckily for the garden, my friend had to give up his driving license before he could make another trip to Kingsville. This allowed the nurseryman to complete the job, and we were

delighted to find that all the purchases fitted into the small garden. Throughout the summer the garden has a neat, cool appearance and in winter it remains an interesting feature in the Crosslands landscape. To my client's delight it has become a curiosity throughout the community, and has even merited mention in the *Crosslands Chronicle*.

One growing season has made an enormous difference at Crosslands and the place is gradually losing its newly-planted look. A walk through the community reveals an extraordinary variety of gardens, window boxes, even cold frames and greenhouses. In one area space has been set aside for residents' vegetable gardens. An active horticulture committee meets frequently to discuss landscaping problems around the community and to initiate new plantings.

For me the benefits of my associations with Crosslands residents go far beyond the experience I gained in landscaping. Without an exception my new-found friends were facing this somewhat traumatic period in their lives by turning towards the future rather than looking back towards the past. Planning and tending a garden can play an important role in the lives of older people: as they put the garden to bed in the fall they have an additional objective on the horizon-to open it up again next spring. It was a pleasure to be associated with these forward-looking spirits.



Jane Pepper is Public Information Coordinator at PHS. Her weekly column appears in the *Main Line Times* and *News of Delaware County*.

Facts & Fancies

ABOUT SOME HOLIDAY HORTICULTURE

(who hangs the holly first in your house?)



Holiday horticulture has much tradition attached to it. I find plant lore to be a fascinating study, and the PHS Library has a comprehensive section on the legends of plants.

I've chosen five different plants that are traditionally connected with the holiday season. You may be familiar with some, others may be completely new. Why not consider giving one or more of these plants as holiday gifts. Do alittle research and include the holiday legend with your gift card.

The Christmas rose (Helleborus niger) is not a rose at all, but rather a



member of the buttercup family. The Christmas rose blooms at Christmastime sometimes even under a cover of snow. For thousands of years it was used in Egypt and Greece as a medicine supposedly curing a variety of ills.

The holiday legend reveals that a little girl was saddened because she had no gift to bring to the manger. An angel appeared and caused a nearby helleborus to burst into bloom. The little girl gathered the flowers and presented them to the new born babe who much preferred them to the gifts from the Magi. I can't guarantee that you will prefer Christmas rose over a gift of gold, but if you have a spot that is moist and semi-shady try one. Some people might consider finding a blossom in your garden in December or January a treasure more precious than gold.

I find the Christmas rose and its close relative the Lenten rose (H. orien-



talis) that blooms at Easter time among the easiest of perennials to grow. It may take a year or two before they start to bloom, but after that all they require is a light fertilizing in the spring and plenty of moisture during the hot, dry months of summer.

Hedera helix. English ivy comes in a variety of shapes, sizes and forms. Some grow indoors, some grow outdoors and



to some it doesn't matter. You can grow it in a pot, on a trellis or frame, as a hanging basket or groundcover. According to legend, ivy was a remedy for disease, prevented drunkenness, insured fidelity, fertility and happiness. Ivy was used to decorate the outside doorways of homes and churches during the Christmas season.

Ivy is not difficult to grow in almost any form. Good light, adequate moisture and an occasional fertilizing are all that is needed. The interest in ivy comes with its many variations and the way you choose to use it. Try combining two or more types in a topiary piece. Hedera helix 'Shamrock,' 'Itsy Bitsy,' 'Needlepoint,' and 'Glacier' are but a few of the many varieties suited for topiary work. Hardy ivies such as Hedera helix 'Baltica' do well trained on a wall or even a wood or wire frame outside, Hedera helix 'Fluffy Ruffles' is a good curly ivy for outdoor use in protected areas. I have it growing along the top of a low dry wall in semi-shade and it has done well during the past two severe winters. I have found that any hardy ivy will suffer if grown in full sun during the winter. In my previous garden I had Hedera helix 'Baltica' in full sun on a south bank. While the plants were not killed, it took until the middle of summer for new growth to cover the winter damaged foliage.

The biggest problem with indoor ivy seems to be red spider mites. The part of the legend that deals with fertility must be true since spider mites certainly thrive on ivy. During the winter months inside I have found that a daily misting with a fine spray of water combined with a weekly washing under the spigot will keep the population under control. During the summer months when the potted ivies go outside on the terrace a monthly spraying of kelthane will control the problem.

Ilex aquifolium, English holly is the traditional Christmas holly and it is used today in combination with *Ilex*



Facts & Fancies continued

attraction to the sun because of its evergreen quality. Witches despised holly and it was hung around windows and door frames to prevent them from entering. My favorite legend concerns domestic tranquility. It is said that whoever brings holly for Christmas into the house first, be it the husband or the wife, will be the ruler for the coming year.

We are fortunate in the Delaware Valley area to have a climate conducive to holly culture. Most varieties will grow in any location. Some protection from strong winter wind and reflected sun is suggested. Keep the plants well watered in summer. Lindane sprays will help prevent the holly leaf miner from disfiguring the foliage. If you give or receive a holly as a gift this season remember that it is a hardy plant and while you probably won't be able to plant it outdoors right away you will want to keep it watered and in a very cool sunny location in the house. Do not use young holly plants as centerpieces on living room or dining room tables. Sunporches, deep windowsills or bright unheated rooms are good locations for wintering over your new holly plant.

Laurus nobilis, laurel or bay as it is commonly called, has been used for incense for centuries. Persons highly esteemed were crowned with laurel. Laurus should be not confused with either mountain laurel or bayberry. It is the bay that we use in cooking. In Europe, bay is used to decorate churches at Christmastime. If you have a friend who fears electrical storms, a bay plant is the ideal gift. A bay leaf held in the hand is guaranteed protection from thunder and lightning.

- London 1887.
- 2 Illustration from Royal Horticulture Society. Dictionary of Gardening, Vol. 2, Fred C



as well as useful container-grown plant. The culture is much the same as for other herbs grown indoors. A temperature between $50^{\circ} - 70^{\circ}$; as much sunlight as possible. Do not allow the plants to remain pot-bound for a long period of time. The major pest that plagues bay plants is the blisterlike scale. Check for it on the undersides of the leaves often. A brush will remove a small infestation; larger cases should be treated with an oil spray.

Rosemary (Rosmarinus officinalis) is for remembrance and is often thought of as a funeral herb. On the other hand this member of the mint family also symbolizes happiness. The legend states that Mary was fleeing to Egypt and took shelter under a rosemary bush; she hung her blue shawl on the plant. During the night the blossoms changed from white to blue. The plant then became known as the Rose of Mary. Rosemary has been used for cooking, medicine and incense. What



nicer plant could you give for a holidaygift than the plant of remembrance?

The culture of rosemary is the same as for the above-mentioned Laurus nobilis. My experience is that it is important not to overwater a potted rosemary. I keep mine in a bright unheated room during the winter with a night temperature of 40° - 45°; I water very little (enough to prevent the soil from becoming brick dry). Put the plant out early in spring in a location where it will receive full sun as the summer progresses and you will be rewarded with a cover of tiny blue blossoms.

There are my five plants for this holiday season. Try one or all either for yourself or as a gift. Meet their growing requirements and they will repay you by delighting the senses of taste, touch, sight and smell. Enjoy the plants for all they offer including their lore. And remember if you want to rule the roost get the holly on the mantle first. Happy Holiday!

- 1 Encyclopedia of Horticulture, L. Upcott Gill,
- 3 Illustration from The Ivy Book: The Growing and Care of Ivy and Ivy Topiary, Suzanne Warner Pierot
- 4 Illustration from American Horticulture, Fall 1960, Vol. 48, No. 4
- 5 Illustration from The Book of Spices, F Rosengarten, Jr., Livingston Publishing Company, Wynnewood, Pa., 1969.



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THE

green scene

HORTICULTURE IN THE DELAWARE VALLEY

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The young person is Pierre Radebaugh.

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The Sale of Raraflora II: Inevitable or Horticultural Rape



Corner of the pool landscaped with azaleas, and *Acer palmatum* 'Scolopendrifolium.'

by Betsy Shuman

This is a personal report of my experiences at Raraflora, an exceptional nursery and arboretum in Feasterville, Pennsylvania. Over the years many plant people—horticulturists, landscape architects, nurserymen, plant pathologists and members of botanical research institutions—have been involved in some way with Raraflora. Their impressions and opinions probably differ from mine.

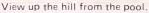
RARAFLORA I

the past

During the spring and summer of 1978 I had the unique and somewhat privileged experience of working at Raraflora, a privately owned nursery and arboretum of rare and dwarf plant material (mostly conifers) in Bucks County. I say privileged because from its beginnings in the late 1940s until 1976 the only people who worked there were its owners and developers, Fred and Helene Bergman, and their family. They did everything themselves. All recontouring and terracing of the land (a 30-acre "spent" farm), dragging tons of stone up the steep hill from the creek, landscaping, propagation, transplanting, weeding, you name it. Over the years they worked hard to create a remarkably beautiful, unusual arboretum of rare plant material. For many years, Raraflora was the only place where you could find certain plants. People from all over the world came there.

Raraflora was probably the first specialized collection of dwarf conifer material of its magnitude—several acres of arboretum and more nursery beds, with a greenhouse for extensive propagation. The Bergmans were pioneers in the field, and collected plants the way some people collect early art masterpieces. Because of the age of the collection, most of the material was mature, not just a few years old, and stored in a 2-quart container in a nursery bed. To wander through the arboretum was







A part of the nursery during the auction.

definitely a horticultural thrill. Around every bend there was something special. That's why I decided to work there.

Though I was a neighbor of the Bergmans for many years, I did not know what Raraflora was. The Bergmans purposely kept an exceptionally low profile. Visits to Raraflora were by appointment only which were hard to get. In spite of our proximity, I did not hear about it until I was on a PHS trip to the National Arboretum in Washington, in the early summer of 1977. We went to visit the Bonsai collection, and the Gotelli dwarf conifer collection. One of the men involved with the Gotelli collection spoke about Fred Bergman who provided plant material, advice and consultation for the Gotelli collection. I was surprised to learn that Raraflora land bordered my own community.

One night during April of the following year, Helene Bergman called me—out of the blue. I still had not met them, though what I learned in Washington had made quite an impression. It was my first encounter with an extensive dwarf conifer collection of such size and importance. She had been given my name by a mutual friend,



The pool, looking east. Photo taken in 1979.

who is an excellent horticulturist and my horticultural mentor, as a person who might be interested in working at Raraflora. Would I come talk to her?

I will never forget the first impression I had of the place. After a brief meeting with Mrs. Bergman she invited me in to wander about the place by myself and see what I thought. It was a rainy morning, grey and cold. Sometimes the rain would change to mist; the grey day intensified the blues and greens and golds of the plant material. I was thoroughly amazed and over-

whelmed at the wealth of plant material, by the incredible beauty and variety, not only of the specimens themselves, but with the artful way they were associated with one another. Their arrangement showed real genius, knowledge of the individual specimens and how they grew and which would enhance another's beauty—plant associations arranged by color, texture, form. I wandered around for a long time. I wondered if Mrs. Bergman wondered why I was out there in the rain so long. It was hard to stop looking. And as I



Cedrus atlantica 'Glauca Pendula' [sic] espaliered against the southern side of the house.



Members of Dickerson, Inc. auctioneers at work in June.

look back it's not that so many individual specimens stood out in my mind so much as the whole collection. What a marvel.

Raraflora had another quality that's hard to describe. People who've been there have talked about it with me and experienced something of it too—there was a real mystery about the place, a kind of exotic, unusual, eerie sense, a strange feeling in walking around there, intensified by the grey mist of that particular day. Must have been all that twisted, contorted, draped and hanging-over plant life.

I started working a week later. Two days a week—weeding the beds, pulling out honeysuckle, chickweed and other undesirables, and spraying insecticides and herbicides. The work was at times boring and arduous (and uncomfortable

on hot days when I covered myself from head to foot to protect myself from poisonous chemicals). I rarely saw another person. Sometimes I half expected to see someone hanging around a corner, behind a tree, in the potting shed—there was that "sense" again, very distinct. Sometimes Mrs. Bergman's doberman pinscher Hans would come racing by. He was a fierce dog. I'd know he was coming though and could prepare myself, so I was never surprised by him, fortunately.

Many of the beds were planted as a showcase for one genus, so I could study many species of a genus while working, and examine the subtle differences between them.

I'd eat my lunch by the pool. The pool and its environs are a story in themselves. The house sat on the crest of a hill. To the south (and back of the house) was a steep, terraced hillside. The pool was nestled at the bottom, at the edge of the "cultivated area." Beyond was a woodland laced with unused bridle paths (the Bergmans had had horses too, the old farmhouse had been renovated, and there were several barns and large pasture areas), and a creek wound its way through. Sometimes I wondered what was more beautiful, the man-made collection, or the natural one.

The pool wasn't usable by the time I started working at Raraflora. I have never seen a more attractively landscaped one though. In May the hillside was ablaze with dogwood and azalea.

Myriad lacy, delicate Japanese maples softened the hard edges of the concrete and pebble apron. The incoming water spilled over a waterfall into the pool. The water was murky, beautiful greensided frogs lived in it, tadpoles grew bigger and bigger; their numbers dwindled. Rumor had it that there was a crusty old snapper at the bottom. Snakes slithered away as I came to the edge. I was occasionally afraid I'd fall in, or, before I knew him, that I'd have to jump in to escape from Hans's sharp white teeth.

Of everything that grew there my favorites became the Japanese maples. (Japanese Maples, by J. Vertrees, Timber Press, 1978, discusses many of these beauties.) I didn't come across them right away, and they took awhile to capture my heart, but they really grew on me. These were one of Mr. Bergman's special interests. Some were incredibly rare—one or two of which there were less than 10 in the country. One especially I came to love, an Acer palmatum 'Toshiki Shidare.' I'd check it every day. It was in a corner of one of the nursery beds, a "specialty" corner. One day I noticed it was gone. It hadn't been sold (it wasn't for sale: it was the only one). It was upsetting to think someone had actually stolen it. I found it about two weeks later, under a Norway spruce by the driveway, lying on its side (no sun, no water). One of its two branches was dead, the other in poor shape. Someone hadn't gotten it quite to his car. Mrs. Bergman put it in the garage and was able to sustain it. Another I wanted for myself, Acer palmatum 'Scolopendriifolium'. At the time of the auction I looked for it, but it too was gone, and I didn't find it.

Many specimens were perfect candidates for bonsai. Diminutive leaves, gnarled roots in tiny pots, good branching structure. As with other species, one could see immature specimens in the nursery, then go to the arboretum and see them well-grown and mature. You'd know exactly what you were getting.

Another popular bonsai item was the rough-bark pine, *Pinus thunbergi*ana 'Corticata'. Because the bark of a relatively young tree is thick and rough, it gives the impression of being much older than it is in years, and can be kept quite neat and small. These little gems were highly prized and brought high prices.

RARAFLORA II the present

I've been using past tense to describe Raraflora—as if it had been. In many ways it is gone. It was sold in July, 1978. A group of lawyers made the purchase. It was unclear to me what their intentions were—but I was hopeful. The Bergmans hoped to sell Raraflora to someone who would "keep the arboretum collection intact." The new owners were reported to be "plantsmen."

It was a busy fall—I didn't hear much about Raraflora. Mr. Bergman had died and Mrs. Bergman was moving—I'd go by and see the gate across the long lane up the hill, the mail box was still there—but no signs of activity.

One morning in April 1979 while sorting through Library mail I came across an announcement "World-renowned Raraflora—AUCTION." The brochure mentioned Fred Bergman and referred to the nursery. I was very surprised, but figured that just the nursery was on the block. How could "plantsmen" sell the whole collection?

A week before the sale in early June I saw signs—RARAFLORA II—pointing the way to the entrances. The night before I stopped and spoke to one of the new owners. I asked what was being sold, and he said emphatically "Everything." Imagine my surprise, disappointment. It was inconceivable to me that anyone, even plant haters (is there such a creature?) could tear apart the collection. But the next morning it started.

I felt very strange at that auction, possessive of the plants I had worked so closely with. The auctioneers were very business-like calling out a particular specimen's virtues. Information was given to them by a man who has known the Bergmans well for many years and who knew all the plant material (he has his own fine nursery near Doylestown). Bidders paid royally for a computer catalog of the plant material, listing over 7,000 specimens. The horticulturist who compiled it did it in two weeks' time. With few exceptions for groups of very small seedlings,

each plant was cataloged separately.

I spent time talking to people I knew at the auction; they responded variously about the drastic change that was taking place. One landscape designer friend (who was there with her partner bidding) described it as "a horticultural rape." I agreed. An older man was more philosophical. "Mr. Bergman has died. It's bound to change." Too complacent, I thought. I wanted to find out what these so-called "plantsmen" were up to. They wouldn't give me direct answers, but I found out—a housing development. Thirty-three acres of land

I wanted to find out what these so-called "plantsmen" were up to. They wouldn't give me direct answers, but I found out—a housing development.

and as many houses as they could squeeze onto it. I was shaking by then. I just couldn't believe it. HOUSES!

The auction was scheduled for two days. It went four, and only part of the place had been covered. "Contract diggers" (so their tee-shirts proclaimed) were introduced and on hand, and I understand that starting after the end of that auction, plants started moving (I wasn't around to watch). People who had bought smaller specimens in containers from the nursery took them. (The special *Tsuga canadensis* cultivars that I coveted sold for \$150-\$250; a mature specimen of *Pinus parviflora* 'Bergmani' for \$13,000.)

A second auction was held in mid-November, which I understand was poorly attended. It's likely there will be another sale in spring 1980 to sell the remaining plants (about 40%).

I have talked to many people since the auction. Most seem to think it's "a shame," but "inevitable." Naturally, when a place changes hands it goes through changes, but these changes are so irreversible. As one horticultural consultant pointed out, many of the beds had been planted "temporarily" and specimens had been planted in pots—so the roots were girdled, pots broken to bits and if the arboretum were to remain intact, these problems would have had to be corrected.

The rumor is that the Bergmans'

house and garden immediately adjacent will be resold as a unit. The house was a marvel too, another example of their skill and creativity. It was built completely by the Bergmans, from its slate roof, to the iron work ornament inside. Along the entire south side grows espaliered cedar, cataloged as *Cedrus atlantica* 'Glauca Pendula.' It is part of the house, the living part of an inert, immovable mass. It, too, is cataloged and so theoretically for sale. On the front lawn is a lily pond.

In spite of the philosophical rationale, the inevitable shake of the head, I am deeply saddened by this devastation. Plants growing side by side unearthed, roots ripped apart and moved to who knows where, into what growing conditions (people for the June auction came from New England and Texas; publicity will spread the news of upcoming auctions even farther). Who can predict how many specimens will survive? The risk is great, and large amounts of money are involved. What if the plant dies? Many are irreplaceable, one of a kind. Even the best contract digger can fail. An old, experienced nurseryman told me a story once of having moved a Tsuga canadensis 'Sargenti' to his property. It was about 25 years old, 5-6 ft. high, 10 ft. in circumference. A magnificent thing. Great care was taken in moving it. But it began to fail, and it died. It had been planted an inch too deep, and it suffocated.

To my mind there's an ethical consideration here. Do we really need more houses? Isn't it important to preserve something that is great and beautiful? What about the oriental practice of honoring living things, plants and people, that are treasures?

It is ironic, too, that this is what has happened to a place that was carefully underplayed and guarded for many years, and inaccessible to most. During the auction the place was full of cars, swarming with people. I think the Bergmans would have been outraged. One of the Bergmans' daughters was there. I wondered what she was thinking.

versity, Ambler Campus.

Betsy Shuman was assistant librarian at PHS until November, 1979. She has an associate degree in horticulture from Temple Uni-

the green scene ● jan. 1980



Interior of suburban solarium/greenhouse. Note 60° angle on southeast wall and vertical glazing on southwest wall. Brick floor for heat storage. Anna Piranian visits the greenhouse.

SOLAR GREENHOUSES

An energy sensitive public is beginning to discover that a properly designed greenliouse in the Philadelphia area can get most of its light and heat requirements from the sun alone. If it happens to be an attached greenhouse, it can also supply the rest of your home with a significant amount of heat. The trick is to collect the sun's energy when you want it, keep it inside and store any excess heat until you need it at night or during cloudy periods. The design and construction principles that set the solar greenhouse apart from the conventional greenhouse are fairly simple but they must be carefully considered and fused together to produce an energy efficient space for raising and enjoying plants.



Last winter I received a call from a woman whose husband had promised her a greenhouse as a present. She was consulting with various manufacturers trying to decide which model to buy when fuel costs took another upward leap. She asked several companies about solar greenhouses but was told "solar greenhouses don't work around here." A mutual friend brought us together and we sat down to talk about greenhouses, solar and otherwise.

One of the things I have noticed about greenhouses that struck me as paradoxical is that you can go into one to water in the winter and the vents are wide open. Before you finish, the vents are closed tight and the heaters are going full blast. In the summer the greenhouse is like the desert in a dirty aluminum frame, nearly unusable.

My own view is that a solar green-house, especially an attached one, should be more than just a greenhouse. It should be a vital area, usable on a year-round basis, inviting you to come and sit, work or relax, providing you with a growing environment and a source of warmth for your home.

By following certain design and construction principles it is possible to produce a greenhouse that will collect the sun's energy, keep it inside, and store the excess until it is needed.

I usually approach the design process with a "solarium greenhouse" concept, and I tend to use materials associated with quality construction: cedar, redwood, brick, slate, and of course, lots of large glass. Sitting areas and fountains are usually integral to the interior space, and sometimes a solid east or west wall is opened up to frame a vista. Any innovative designer should be able to blend the fundamental concepts of passive solar energy and dynamic architecture.

The sections below will develop the basic design and construction principles and then describe two solarium greenhouses that represent solutions to very different situations.

planning

Orientation on the Site. The solar greenhouse should have its long axis running east-west so that the longest side of the building can be glazed and presented to the south. This allows the maximum solar gain when the sun is at







Upper left, city rooftop solar greenhouse.

Above, interior of city solar greenhouse. Note water storage containers used for plant stands.

Lower left, suburban attached solarium/greenhouse; view from the south.

its highest position at midday. Moving 15° to 20° east or west of true south will only decrease the amount of sun coming into the greenhouse by about five percent, so there is a good deal of flexibility for individual site considerations.

Glazing Angles for the South Wall. Most of the light striking glass at a perpendicular angle passes through, while light striking at an oblique angle is mostly reflected. Coupling this with the fact that the sun is much lower in the sky during the winter than it is during the summer allows us to choose the optimum angles for greenhouse glazing. Figure 1 shows the amount of sunlight falling upon surfaces at different angles for the Philadelphia latitude of 40° north. In January more light

strikes a vertical (90°) wall than a shallow (30°) roof, and almost as much as strikes a sharply angled (60°) wall. In July the 30° surface allows in more than three times as much light as does the 90° surface, while the 60° plane falls in between. From this we can see that a 90° glass wall admits light during the winter when it is needed and keeps it out during the hot summer months. The 60° wall provides a more optimum winter surface here in Philadelphia, but it does allow the sun to penetrate in the summer. The 30° roof, which is common on many traditional greenhouses, is a poor performer over both seasons, reflecting more sun during the winter and letting it in during the summer. The latitude plus 20° is a good guide for selecting a glazing

angle; specific site considerations may require some adjustments. I often use two glazing angles in the south wall, 90° and 60° , as shown in Figure 2.

The Roof. In a freestanding greenhouse the north roof should be opaque and well insulated. The sun never enters the northern sky in the winter and glazing here will only serve as a tremendous source of heat loss. In an attached greenhouse that portion of the roof nearest the house should be opaque and insulated to prevent the summer sun from penetrating to the rear of the greenhouse. That will help to prevent the terrible overheating conditions which plague conventional greenhouses and subsequently make them so difficult to use and enjoy in the summer. The roof should also contain vents

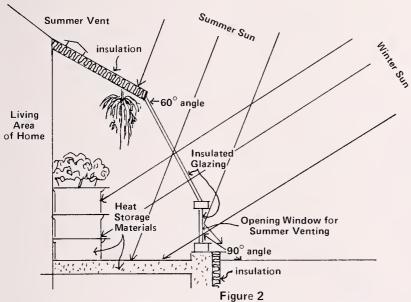
	Glazing Angle	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Typical Flat Roof Greenhouse	30°	2210	1962	1636	1480	1660	2060	2308	2412	2442	2434	2409	2388
Sharply Angled Wall	60°	2074	2074	1908	1796	1944	2176	2174	1956	1760	1670	1728	1894
Vertical Wall	90°	1416	1654	1686	1646	1726	1730	1484	1022	724	610	702	978

Source: ASHRAE, Handbook and Product Directory, 1974 Applications

Figure 1

This chart compares the amount of sunshine (measured in BTUs – represented by numbers in boxes) that strikes a square foot of glass at three angles in Philadelphia on a clear day.

The BTU or British Thermal Unit is a measure of heat: it is the amount of heat needed to raise one pound of water one degree F. The heat content of fuels can be expressed in BTUs, as can the heat losses from a building. Solar energy (sunlight) is measured in BTUs per square foot per hour.



Attached Solar Greenhouse - Section View

that can be opened during these summer months to allow hot air to escape.

East, West, and North Walls. All of these walls should be well insulated and free of any glazing. If the greenhouse is oriented more than 20° east of south, glazing on the west wall might be a consideration. Of course, the opposite would be true for a building to the west of south. All interior walls and ceilings should be painted a light color to reflect sunlight onto the plants from all directions. Any outside entry should be sheltered from the wind and include a mud room or vestibule to cut down on heat loss.

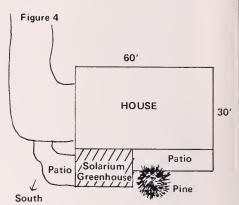
Preventing Heat Loss—Insulation. Heat is lost from a greenhouse in four areas: the glazing, the opaque walls and roof, the floors and foundation, and the cracks around all openings. Each of these must be carefully considered if a solar greenhouse is to perform well. All glazing material, glass or plastic, should be insulated (two sheets of glazing separated by a dead air space; e.g., one piece of 3/16 in. glass separated by 1/4 in. air and another 3/16 in. glass). This will cut heat losses through the glazed areas by more than 50%. The walls and roof should be well insulated; I use 6 in. of fiberglass with a vapor barrier on the inside. The losses through the floor and foundation are seldom thought of in a conventional greenhouse, but they are a steady heat drain. A 2-in. layer of waterproof polystyrene insulation, such as styrofoam, applied to the outside of the foundation walls and extending down below

the frost line, is an excellent way to greatly reduce floor and foundation heat loss. Careful caulking and weatherstripping around all glazing units and openings is a must.

Many solar greenhouses also contain some form of movable insulation that is placed on the glazed areas during the night hours. This can be polystyrene panels that are put up by hand, an insulated quilt or blanket that is rolled into place, or a set of shutters that are closed up at night. Some systems are even automated and triggered by a photosensor. Since any of these systems must be tightly fitted and installed, they require careful detailing and construction; the cost can range from \$4 to \$10 per sq. ft. of glazing. While useful in reducing heat loss, I am not convinced that they are cost effective at this time in the Philadelphia area, and several of the solar greenhouses that I have designed and built function well without them.

Heat Storage. Different materials absorb different amounts of heat while undergoing the same temperature rise. Conventional greenhouses overheat because the air in them only requires 0.018 BTU to increase each cubic foot by one degree. By contrast, a cubic foot of brick or stone needs about 21 BTUs to gain one degree and a cubic foot of water more than 62 BTUs, Placing brick, stone or water in the solar greenhouse will lower the peak temperature as they will absorb a great deal of heat that usually warms the air. A 55-gallon drum of water might increase in temperature by 15° over the course of a day, storing 6800 BTUs of energy.

J. BLAINE BONHAM SOLARIUM/GREENHOUSE Temperature History Figure 3 March 27-28, 1979 (24-Hour Cycle) 90° ° 80° Solarium/Greenhouse Temperature Temperature, 70° 60° 50° 40° **Outdoor Temperature** 30° 20° 12 Time 8 10 6 10 12 6 8 AM PM AM



In the evening the lack of sunlight will cause the air temperature to drop; as soon as the air is cooler than the drum of water, the heat will be radiated back into the air. This warmth will prevent the temperature from dropping as low as it otherwise would. By placing enough heat storing materials such as brick or water in the greenhouse, the upper and lower extremes of the daily temperature swing can be eliminated. These materials can serve as bench supports (water drums) or floor materials (brick or slate) and will not necessarily encroach on valuable space. All heat storage materials should be placed where they will receive direct sunlight, and drums or similar containers should be painted black, dark blue, or green for maximum heat absorption. Back-up heat for extreme cold can be provided by electric baseboard units.

Attached Greenhouse Connections. One ideal connection for a solar greenhouse and a house is to have the wall between them constructed of masonry such as brick, stone, or cinder block. The wall stores heat and delivers it to both the greenhouse and the house. Windows and doors in any connecting wall can also be opened to allow warm air from the greenhouse to move into the living areas during the day; the flow can be reversed in the evening to prevent the greenhouse temperature from going too low. Fans can also be used to remove heat rapidly or to move heat downward or over a long distance.

City and Suburb. A look at two recently completed solarium/greenhouses in very different locations will illustrate how the basic solar heating principles can be applied. The solarium/greenhouse for J. Blaine Bonham, Jr. is located on his rowhouse in the Queen Village area of central Philadelphia. I say "on" because it actually is a third floor addition to his two-story home, opening up onto a rooftop deck and garden. Built in a New England salt

box style, 16 ft. by 20 ft., the walls and roof are heavily insulated except for the south side. Here two sets of patio doors allow access onto the deck. Above them are four more patio doorsized glazing units at a 55° angle. All of the glass is insulated; in the summer the sloped glass is covered with bamboo to help keep the interior comfortable. Heat is stored in a 300-gallon tank of water that separates the stairs from the room and also serves as a bench support. Six 35-gallon drums of water located around the room complete the storage and also hold plants. A small fan and duct system pumps warm air down to the second floor when the solarium/greenhouse temperature goes above 80°F. The solarium/greenhouse was monitored last March for three weeks and the results were most encouraging: the outside low during the monitoring period was 21°F while the corresponding room temperature was 63°F. (See Figure 3 for a 24-hour variation in temperature.)

Currently in the middle of its first winter is Alfred and Magdalena Piranian's solarium/greenhouse addition in suburban Oreland, Pa. Measuring 11 ft. by 23 ft. it is attached to the kitchenbreakfast area of their home and faces about 25° east of south. For this reason the western-most wall features a patio door unit, which allows the afternoon winter sun inside. The room itself is built on two levels, connected by a set of three brick steps. The floors are brick and all of the glazing framing and interior trim is cedar. Because the foundation is well insulated the brick floors serve as part of the heat storage component; drums of water acting as plant stands supplement it. The south wall consists of large (34 in. x 76 in.) insulated glass units set at a 60° angle above opening awning windows. These windows extend to the floor on both levels, conveying a dramatic interior concept to the outside. One glazing

panel was set into the opaque roof to ensure that the kitchen did not become gloomy when the new room and roof were added. This panel frames a large pine overhead that can be seen from a seat at the small table on the upper level. From here you can also look over the fountain and into the working area on the lower level. Initially, the owners were distressed to learn that it was necessary to remove several large pines to the southeast. However, after completion, they were delighted with the new view. The solarium is being monitored this winter and the results will be used to determine the best way to to remove valuable excess heat and recycle it into the normally cool basement.

This process of monitoring and then fine tuning the connection between a solarium/greenhouse and a home is an important part of the final package. It helps to ensure that a solar greenhouse really is solar heated. It also enables the designer and the owner to continue to explore the most effective means of providing heat to other parts of the house. This solar energy enthusiast believes that more such imaginative approaches to integrating energy efficiency and horticulture are essential in the future.

Suggested Reading

Bruce Anderson, *The Solar Home Book*, Cheshire Books, Harrisville, N.H., 1976. James C. McCullagh, *The Solar Greenhouse Book*, Rodale Press, Emmaus, Pa., 1978. W. F. and Susan Yanda, *An Attached Solar Greenhouse*, The Lightning Tree, Santa Fe, N.M., 1976.

Rick Fredette has an M.S. in Environmental Science and Solar Design. Formerly PHS educational coordinator, he now teaches in the School District of Philadelphia, lectures extensively, and operates his own solar firm, Solstice Design and Building Company. He recently delivered a paper on the Bonham solarium/greenhouse at the 4th National Passive Solar Conference in Kansas City.

by Jan Riemer

Folklore dating back some 4,000 years proclaims the juices from the aloe plant to be a natural remedy for many external and internal maladies and an elixir for youthful complexions.

The gel-like substance was used extensively by Caesar's Roman Legions, and Alexander the Great's soldiers to help relieve skin irritations and discomforts, while ancient inscriptions of aloe plants have been found on the walls in the royal tombs of kings.

Herb aloes were among mankind's first commerce carried by caravans across the Arabian desert to be traded for the spices of India. Spanish missionaries are mostly responsible for introducing the aloe plants to this country, and now over 40 centuries later, a revived interest in the aloe is gaining recognition.

Those grown in warm or tropical climates may reach a height of 20 ft. and produce colorful displays of red, yellow, orange or greenish-white spikes while the aloes used as house plants rarely flower.

The aloe family, a perennial herb belonging to the Lily genus, boasts about 170 species. *Aloe vera*, also known as the true aloe, bitter aloe, Barbadoes aloe, *A. barbadenis* and the medicine plant is the one most commonly used as a house plant receiving considerable attention from physicians and laymen.

The thick, leathery straplike green leaves, dotted with specks of white when young, grow to a length of 6 to 24 in. forming a rosette similar to the century plant. The edges of the leaves have unharmful serrated, toothy margins. The medicinal juices within this fleshy growth can be extracted by cutting the leaf. The gel is a substance called aloin (barbaloin) and is most often used in its pure form as a healing agent. It is also mixed with other preparations for cosmetic purposes, while

A Healing Potion Wrapped in Green:

Aloe vera

"Nicodemus, also, who had first come to him by night, came bringing a mixture of myrrh and aloes." John 19:39



A Healing Potion continued



juices taken for internal problems are mostly diluted.

The natural juices have been used externally to clear up poison ivy, relieve insect bites, acne, psorias, itching, eczema, erysipelas, ringworm, athlete's foot, boils, abscesses, corns, calluses, cuts, wounds, diaper or heat rash, allergies, scars, gingivitis, general burns, sunburn, sunblisters, x-ray burns and problems caused by protozoa. It is also rubbed on inflamed joints for rheumatism relief, into the hair for scalp problems, and on the face for wrinkles.

Although I have used the gel with fantastic results on burns, chapped lips and minor skin irritations, I would hesitate to take it internally without professional guidance. Under proper supervision it has been prescribed in combination with other properties for dysentery, stomach ulcers, liver toxicity, constipation, kidney, spleen, colon and bladder problems, and as a general cathartic to cleanse the stomach.

One cosmetic company has over 100,000 Aloe vera plants growing on a Texas plantation. After the gel is extracted and combined with their own formulas the cosmetics are packaged into cleansers, fresheners, facial masques, shampoos, eye gels, cream fragrances, moisturizers, hand and body lotions, night creams, lip creams, hair conditioners and ointments.

It's generally accepted, however, that when used externally, the natural gel is more effective so why not raise your own *Aloe vera* plants to use medicinally, cosmetically and to enhance your indoor garden.

The potted aloes require very little attention and will thrive in poor soil for years without repotting. When repotting the small rooted suckers that develop around the base of the mother plant, fill the bottom of the clay pot with a thick layer of gravel type material for drainage, then add a mixture of two parts loam and one part sand, and

a dash of lime for good measure. Exert care to plant the new shoots no deeper than they grew originally. Water sparingly and avoid fertilizing new potted plants the first year. Established *Aloe vera* should be fertilized once each fall with a standard house plant fertilizer

One cosmetic company has over 100,000 A/oe vera plants growing on a Texas plantation.

that has been diluted to half the minimum strength recommended on the label.

Some experts claim the plant should receive four or more hours of direct sun. Others insist on bright, indirect light. My own experience has proven that direct sun has no harmful effects during the winter months, but full or even partially direct summer sun will darken or scorch Aloe vera plants. Overwatering, high humidity and too much nitrogen is even more disastrous causing the leaves to yellow and the roots to rot. When the soil becomes very dry or the leaves begin to shrivel, it's time for a thorough watering. Night temperatures, ideally, should range between 50° and 55°, while day temperatures may range between 68° and 72°. Avoid any temperatures that drop below 50° .

Perhaps, in this age of progress that's running rampant with physical side effects from chemicals, nuclear leaks and general pollution, we might borrow the natural way of life from kings, women of ancient Greece, of Madam Pompadour's France, of Leonardo da Vinci's Italy and share in all the wonders from the gel of *Aloe vera*.

Jan Riemer has an insatiable curiosity about herbal remedies.

13

Pierre, who is three years old, grows beans in his sandbox, has his own private mint patch and can name every vegetable in the family garden. At PHS's plant giveaway in September, Pierre and Emily Read Cheston, who has been a member since 1935, spent time in the headquarters' garden discussing the spines on cactus. Pierre is definitely "growing up green," a wonderful phrase used for the title of a book by Alice Skelsey and Gloria Huckaby.



by Mary Lou Wolfe

Is Gardening Caughtor Taught?

The author discusses some contagious children's books.

There she stood, 25 years old, sound of mind and limb, waving her trowel and singing like a four-year-old "I planted it, I watered it, carrots grow from carrot seeds."

As a visiting and admiring mother, I was being serenaded with a piece of my children's past, absorbed from infinite revolutions of a record based on Ruth Krauss's book The Carrot Seed. My grown-up daughter Margery had raised a difficult plant from seed-not a carrot, but no matter. The Carrot Seed had long ago become part of the shorthand of a family that shares books. My children were brought up with Peter Rabbit in Mr. McGreggor's garden, they slipped through the ivy door with Mistress Mary and Dickon to reach The Secret Garden and they practically destroyed a little book I had as a child, Flower Children. This now battered book written by Elizabeth Gordon appealed because it turned flowers

into fetching children. When I was little, it inspired the maiming and dismembering of endless hollyhocks as I tried to recreate "Stately Lady Hollyhock" who "In a lovely colored frock, taught her children every day precisely what to do and say." Flower Children dished out equal portions of botany and morals, both in rather vague terms:

"Nighshade has a purple berry, But he is very naughty, very; Little children never should Play with one who isn't good."

Flower Children, The Carrot Seed and The Secret Garden have one thing in common: they help children to learn to see. Generations of gardeners have used books to introduce children to the natural world. Nineteenth century children were meant to open their eyes after reading Mrs. William Starr Dana's Plants and Their Children, 1896. She didn't mince words:

"If when we are young we let our

eyes form bad habits, such as not seeing the things they ought to see, we are likely to be half blind all the rest of our lives." That should scare the little rascals into counting sepals and petals! As all parents, grandparents and teachers know, there are better ways to spread the message.

The most obvious way to make gardening contagious is to share your own enthusiasm and experience of the outof-doors. One book that helps parents do this is Growing Up Green by Alice Skelsey and Gloria Huckaby. These authors take the weight of the moralistic message off the children and lay it on the parents: "... don't involve your child in gardening with the idea that it will be 'good' for him-that he will learn 'responsibility' by tending his own plants. About as big a deal as you should make of a child's responsibilities to plants is to ask him if he has watered the plant-while you are on the way to

continued



"One by one the pumpkins were lit, placed upon their boats, and set adrift in the current. Some of the boats tipped and sank under the weight of their passengers. But soon there was a long string of boats floating off into the gathering darkness, their glowing passengers staring back in silent farewell."

water it yourself." Skelsey and Huckaby direct this book toward parents and teachers, although much of the text could be enjoyed by a 10 or 12 year old. The nightshade of my Flower Children is introduced not as "He is very naughty, very" but as a poisonous plant having some delicious cousinstomatoes, peppers and eggplants. I was particularly challenged by the authors' philosophy of the celebration of A Beautiful Day. We have been taught to save for a rainy day: they urge saving for a sunny day even when it means kids miss school and parents miss work. "Employers may not demonstrate a whole lot of enthusiasm for this custom, but exposure to the idea might be a good thing for all of us." The Beautiful Day idea will generate some controversy in your family, if only in deciding how it should be spent or what qualifies as a Beautiful Day.

I know a family that celebrates the Beautiful Night-more specifically the summer solstice. All through the spring

garden clean-up, they collect brush in an open field for a ceremonial fire on June 21st. Kids are encouraged to dress for the occasion, preferably in something long and white (the finale for several graduation dresses). The fire is lit by moonlight and onto the pile go the season's first day-lily blossoms and fragrant thinnings from the herb garden. Some mid-summer's nights end in listening to fairy tales by moonlight under a grove of beech trees. This all sounds slightly medieval for my family but we did have great fun sleeping out in August around the twelfth to watch, on our backs, the shower of Persids. This had special glamour for my kids as the shooting stars were usually easiest to see after midnight. A book that encourages such celebrations is The Reasons for Seasons by Linda Allison. Sub-titled "The Great Megagalactic Trip without Moving from Your Chair," it is full of projects and ideas that explain the seasons through good line drawings and a well-spaced text. It's

written for the 10-14 year group and the projects it generates won't require elaborate props: "Most everything in this book can be done by anybody, anyplace, with whatever stuff is around the house. Sometimes you might have to make a special trip to the dime store or hardware store or supermarket." The Reasons for Seasons may inspire some Beautiful Days or Beautiful Nights and certainly a lot of seeing.

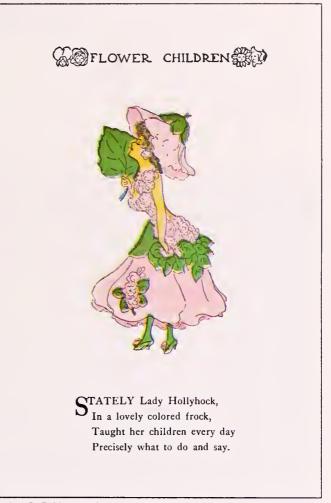
Cavagnaro, Sierra Club Books, Charles Scrib

kin People by David Cavagnaro and Maggie

A brand-new gem of a book, The Pumpkin People, tells about seasons, celebrations, and the cycle of life in an unforgettable way. It was written by David and Maggie Cavagnaro in the new Sierra Club Books for Children Series and aims at six to nine year olds. Why is it then that this book is selling briskly to PHS staff even to some who have no children? Partly because of David Cavagnaro's stunning photographs and also because the story describes a project we would all like to be part of some time. Pippin planted pumpkin seeds, nurtured them, har-







drawings by M.T. Ross from Flower Children by Elizabeth Gordon, published by P. F. Volland Co., Joliet, Illinois 1910.

vested them and invited the whole community of Bolinas Lagoon to a celebration. After carving faces, boats were hammered together out of scraps. "One by one the pumpkins were lit, placed upon their boats, and set adrift in the current. Some of the boats tipped and sank under the weight of their passengers. But soon there was a long string of boats floating off into the gathering darkness, their glowing passengers staring back in silent farewell."

Back in 1896, Mrs. Dana said in Plants and Their Children, "Now, I want you children to see how many different ways you can recall in which plants scatter abroad their little seeds." No one who reads The Pumpkin People will forget the scattering abroad or renewal on the compost heap of the seeds Pippin planted. I must send a copy to Margery, I'll sign it "from Stately Lady Hollyhock . . . who taught her children every day precisely what to do and say."

nature-awareness books for children, parents, grandparents and teachers, available in the PHS Library

(Books mentioned in the preceding article are marked with asterisks.)

- *The Carrot Seed, by Ruth Krauss, Harper & Row, New York, 1945.
- Exploring Plants and Seeds, by Gina Hartell and Ann Dintenfass, School District of Philadelphia Day Care Services, Philadelphia, 1945.
- *Flower Children, by Elizabeth Gordon, P. F. Volland, New York, 1910.
- Four Seasons of Fun, by Isabel Zucker, National Garden Bureau, Birmingham, Michigan, 1969.
- of Art and Nature Projects, by Ada Graham, Four Winds Press, New York, 1976.
- Gardening with Kids, by Sharon MacLatchie, Rodale Press, Emmaus, Pa., 1977
- Indoor Gardening in the Classroom, Penna. Horticultural Society, Philadelphia, 1976 The Giving Tree, by Shel Silverstein, Harper & Row, New York, 1964
- *Growing Up Green, by Alice Skelsey and Gloria Huckaby, Workman Publishing Co., New York, 1973
- My Garden Companion: A Complete Guide

- for the Beginner, by Jamie Jobb, Sierra Club Books, San Francisco, 1977 Nature Printing, by Robert W. Little, pub-
- lished by the author, Pittsburgh, 1976 *Plants and Their Children, by Mrs. William Starr Dana, American Book Company, New York, 1896
- Play with Plants, by Millicent E. Selsam, Revised Edition, William Morrow, New York, 1978
- *The Pumpkin People, by David Cavagnaro and Maggie Cavagnaro, Sierra Club Books, Charles Scribner's Sons, New York, 1979
- *The Reasons for the Seasons: The Great Cosmic Megagalactic Trip Without Moving from Your Chair, by Linda Allison, Little, Brown, Boston, 1975
- Foxtails, Ferns and Fish Scales: A Handbook *The Secret Garden, by Frances Hodgson Burnett, Dell, New York, 1971
 - Sharing Nature with Children: A Parents' and Teachers' Nature-Awareness Guidebook, by Joseph Bharat Cornell, Ananda Publications, Nevada City, Calif., 1979 The Sierra Club Summer Book, by Linda
 - Allison, Sierra Club Books, San Francisco, 1977
 - Ten-Minute Field Trips: Using the School Grounds for Environmental Studies, by Helen Ross Russell, J. G. Ferguson, Chicago, 1973

by Roxie Gevjan



Androsace seedling in crevice, probably A. mathildae. Photographed in alpine house. See page 19.

It didn't take long for me to feel the need for a change in the style of my alpine house once it was built. Originally there was joy in anticipating its construction; then when it was completed, I felt a great excitement in filling the benches with plants. At first, I mostly potted up sempervivums from the garden to fill space, but when the house was operating with a full complement of plants, problems quickly arose concerning maintenance and general care. As with all gardens, time became a critical factor.

The first problem was watering. Alpine houses are actually cold greenhouses, filled with plants in pots, each of which has specific watering needs. Some plants should be dry at certain times in their growth cycle, wet or moist at other times. Some tolerate no overhead water either on their leaves or their crowns. Others respond well

to ordinary watering techniques. Another problem was exposure—sun, light, shade. And so it went—prima donnas even in the plant world. I decided to carry out my original plan of a "permanent" garden in the center bench, reflecting a mountain scene in the hope of creating a variety of cultural situations to accommodate the plants, as well as cutting down on the hours demanded for proper care.

getting the mountain ready

The date to begin this arduous task was set for early March, 1974, right after The Philadelphia Flower and Garden Show. To create the mountain, every pot in the center bench had to be moved elsewhere. Hardy plants from all three benches were moved outdoors to sheltered positions to provide a more gentle acclimatization from drying winds. The winds could be damag-

ing to some plants that had been rather protected in the alpine house. Plants that could not survive overhead water on their leaves or crowns were kept indoors, for more selective watering, replacing plants taken from the two side benches. As many plants as possible were kept indoors to avoid unnecessary losses, for March weather can be unpredictable. There was much jockeying around of pots, but the task was finally completed.

The center bench measures 59 in. x 155 in. Inasmuch as all pots were plunged in sand, now came the problem of removing all the sand by using any container I could locate and carry. Next, I removed all drainage material from the bottom of the bench and wirebrushed each section. The benches are redwood; therefore, zinc liners with drainage holes were made and fitted into each section. These holes could be

plugged, if necessary, for watering purposes, then opened to allow excess water to run off. An Orangeburg pipe with an upright fitting was placed diagonally in the bottom of each section. The upright fitting was to be used for watering. The opening on this fitting is always kept closed with a cork except when the section is being watered through the pipe. The bottom pipe was covered with plastic screening to prevent debris from occluding the holes.

Now the fun began. The sections were filled with a mixture of three parts sand to one part leaf mold. This is what alpine gardeners call a "starved medium," supposedly what most high alpines do best in. Mixing this medium was an arduous task, taking much longer than I had anticipated.

No drainage material was added.

The ultimate goal was to create the illusion of a mountain scene. This required camouflaging the dividers and building the garden up high, which demanded great quantities of growing medium. Since many alpines, according to the texts, prefer lime, I purchased quantities of tufa for the mountain range. After experimentally placing the tufa, I gradually created the effect I wanted. It looked very promising. The danger at this stage is not getting enough variations in heights; so, the final finishing touch was to raise considerably the largest (and heaviest, of course) stone. It worked. An exciting phase was now completed and a new

one presented itself: it was time to plant.

planting

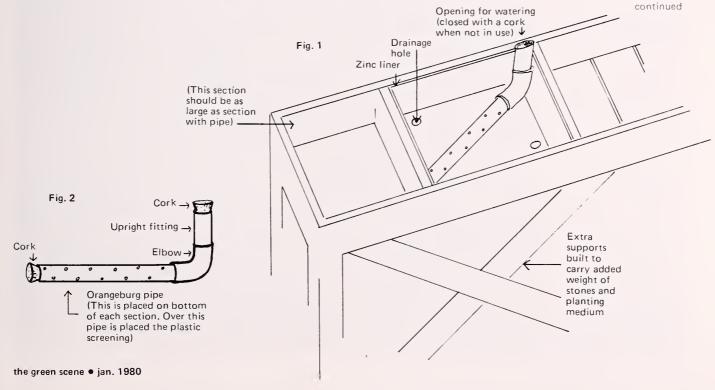
Planting a garden of this type is very much like planting any other garden. For both you must consider physical environment, such as light, exposure, degree of shade and moisture. Just as important to consider are the physical characteristics of the plant: size, rate of growth, form, texture, color of foliage, color of flowers and cultural needs. Conifers can be used but are usually transients, moving outdoors when they grow out of scale. Some plants were put permanently into the garden, but I prefer plunging them in their pots deep enough to conceal the rim of the pot. I use only clay pots for plunging because they more readily absorb moisture from the planting medium. Conversely, to avoid evaporation, the pots must be completely covered with the soil mixture. This plunging has, of course, cosmetic value as well, and the method makes it easier to handle the individual soil and water requirements for the plants.

Whenever necessary the bench is soaked by inserting a hose with a water volume control nozzle into the upright fitting of the Orangeburg pipe. This allows me to water the garden and attend to other chores in the alpine house concomitantly. I water the plants as necessary; the tufa is watered frequently. Tufa retains moisture, which is recycled into the soil. As the planting

medium or soil dries out the tufa releases its moisture. (See box for list of some plants successfully grown on the center bench.)

The many successes with plants were accompanied by some failures. A failure, of course, does not apply to a plant that is by nature short-lived, such as the beautiful Campanula morettiana. In planting this garden, I followed the texts rather carefully but have come to the conclusion that texts are guidelines at best, and not absolutes. Changes must be made. It is impossible to give alpines the exact growing conditions under which they flourish in their natural habitats. It is also difficult to interpret exactly what is meant by "starved medium" (in spite of formulas), and to determine if it really is a fact that plants prefer this type of growing condition. We must consider that, although alpines provide their own meager quantities of humus, the process of plant decay has been a continuing action over long periods of time. It is important also to bear in mind that in their own environment many of the alpines are generally smaller and more compact and may therefore require less nourishment than in cultivation. In nature, their roots are very long-often well over two, three or four feet-seeking food and water. It is difficult to determine in such instances the quality or composition of the soil particularly when the plant in question grows tightly wedged in a rock crevice.

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Saxifraga - foreground, left of center Acantholimon armenum - foreground, right of center.

Dianthus - center, extreme left Townsendia parry i seedlings - center, towards back

Erodium champaedryoides roseum - above center, towards right; large, round plant Eriogonum caespitosum - below Dianthus Sempervivella - single rosette, lower right Daphne arbuscula grandiflora behind grassy leaves (Sisyrinchium macounii)

Hormathophylla pyrenaica - upper right, in crevice, small plant

Soldanella minima - center, small clump

Saxifraga cotyledon - good illustration of crevice planting



I am convinced that I lost many of my plants in the center bench because I gave them a soil mixture with too little nutrient value.

Claude Favarger, an eminent Swiss botanist, states that alpine plants are overnourished because "the high luminosity of the environment which, by favoring the assimilation of carbon by the leaves, results in excessive production of sugar. This sugar cannot all be converted into starch, because of the low night temperatures, and so it has to remain in the plant cells." He explains further that this sugar aids floral pigments in resisting freezing of cells, etc. Certainly, it is logical to assume that some of this excess sugar must go into the root system to nourish the plant. It is plausible, then, to consider that the quality of the growing medium for montane [alpine] plants is only one factor for success and must be

evaluated in relationship to all factors and adapted to a change in the environment. I cannot change the light factor; therefore, I compensate by using a richer medium than prescribed. Having successfully grown many outdoor plants in conditions opposite to their cultural "requirements" I feel quite confident that a second planting of the center bench using a richer medium will prove successful. The challenge is ever present and I shall certainly accept it when time and plants are both available.

Roxie Gevjan's garden is one acre and includes a small controlled woodland, a collection of conifers, rare and slow growing, plus a rock garden and two screes. She is a trustee at Bowman's Hill Wildflower Preserve and occasionally lectures to various organizations. She notes that her horticultural background is not academic, but practical. She has learned primarily through garden visits, plant societies, friends and actual experience.

PLANTS GROWN ON CENTER BENCH: Acantholimon armenum Androsace spp. Aquilegia 'Blueberry' Campanula spp. Ceterach dalhausiae Cyclamen cilicium Daphne arbuscula grandiflora Dianthus affinis erinaceous Draba polytricha Eriogonum caespitosum Erodium spp. Haberlea rhodopensis Iris reichenbachii Lithospermum diffusum 'Grace Ward' Morisia monanthos Petrophytum caespitosum Phyteuma comosum Polygala chambaebuxus rhodoptera Ramonda myconi Saxifraga spp. Soldanella spp. Townsendia spp.

Also an occasional dwarf bulb





Erodium chamaedryoides roseum - lower right, mound, pink flower

Androsace mathildae - right, on flat rock.

Saxifraga (in variety) - same area but not on the rock

Sisyrinchium macounii - foreground, left center (grassy leaves)

Dianthus affinis erinaceous left center to right of label Juniperus chinensis foemina dwarf conifer left of Erodium

Campanula morettiana alba lower foreground behind green label

Draba polytricha - left of center rear, on top of large stone (outline against window; a small bun)

Saxifraga exarata - center foreground, right of grassy foliage

◆Cyclamen cilicium - lower left Saxifraga exarata - center left, behind stone

Acantholimon armenum - left rear, spiny plant

Iris arenaria - center left, grassy foliage

Dianthus affinis erinaceus - center, pink flowers

Erodium chamaedryoides roseum - on right, at edge of bench (deep pink flowers) Sedum pilosum - below center on right, single rosette



by Jane Pepper

They were Burpee's best-selling vegetable last year. Seed companies throughout America sold more than 550,000 pounds of them, and more than eight million gardeners planted at least one row of this new delicacy. Of course, I'm talking about the wonder vegetable of 1979, the sugar snap pea. In 1978 it was awarded the All-America Selections Gold Medal; one seed company featured it on the cover of their 1979 catalog, and the horticultural press sang its praises from late winter through early spring.

Gardeners are typically adventurous and eager to try new varieties. The advertisers said the pods were edible but unlike flat-podded snow or Chinese peas, which must be picked young, they said sugar snaps could be picked when the peas are fully mature and the pods full size. We grew them in our garden and loved them, and I wondered how other gardeners felt about their first experiences with sugar snaps. I also wondered if they considered the peas had lived up to the claims of their advertisers.

In late fall my curiosity got the better of me, and I made an informal survey of Delaware Valley gardeners. More than 20 sugar snap growers responded to my questionnaire and an outstanding 95% enthusiastically said they plan to grow sugar snaps next year. Eighteen out of twenty-three respondents could foresee the day when they would grow only sugar snaps in lieu of snow peas and regular peas. Some have already converted. Only one person preferred snow peas to sugar snaps. One family mentioned that they liked the sweetness of sugar snaps but found them too bulky in an otherwise finely cut Chinese dish. Several mentioned that they preferred sugar snaps to snow peas because you could harvest the pods over a long period. Snow pea

pods tend to turn tough and stringy almost before you have a chance to pick them. One gardener indicated that she will continue to grow regular peas as well as sugar snaps because the regular peas bear much earlier. She specifically mentioned 'Sparkle.'

Comments on germination and yield were mixed. Some mentioned prolific yield, others were disappointed. We found them prolific and were delighted

At present sugar snaps are difficult for commercial growers to handle because of their height, but they are becoming popular in restaurants and gourmet vegetable stores.

because they produced good pods through early July. First-time sugar snap growers should be aware that they will produce later in the season than early varieties so don't get impatient for your crop. Some gardeners were troubled by poor germination: try adding fungicide such as Captan next year. Despite the wet spring we had no germination problems but the soil in our vegetable garden drains very quickly.

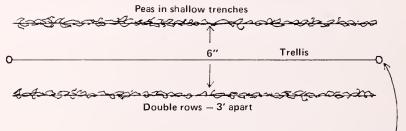
When it came to consuming the harvest most people seemed to favor sugar snaps raw in salads or with a dip or cold cuts. We tried boiling them for a very short time. This was not nearly as successful as when we stir-fried them in our wok. The sweetness of the pods increases as they grow so you should not harvest them until they are fat. Some gardeners were enthusiastic about sugar snaps as a frozen vegetable. James Wilson, Executive Secretary of All-America Selections, had received a few negative comments about frozen sugar snaps, but said that several of the correspondents agreed they had probably blanched the pods for more than the recommended two minutes. When we

were satiated with pea-pod salad we started shelling them to serve as regular peas. We thought they were delicious; some respondents mentioned that the pods were difficult to split.

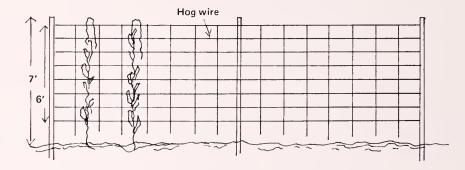
In addition to general agreement that the advertisers of sugar snaps were generally telling the truth, there was agreement over another sugar snap issue. Supporting these tall growers is a problem. The chicken wire we use to support the traditional peas is only three feet, the string netting five feet in height. I was too cheap to purchase taller wire—and in any case I didn't believe the advertisements which said that they would grow from 6 to 8 ft. tall. By early May the peas had covered our fence. When we finally pulled them out they were bent double, pulling the fence down with them but continuing to produce.

Vegetable breeders are, I am told, fully aware of this problem and hope within a few years to produce a smallergrowing sugar snap. The owner of one large seed company indicated that a dwarf sugar snap pea has already been developed in Europe but it is disappointingly tasteless when compared to the remarkably sweet taller variety. While you are waiting for them to produce a line of smaller sugar snaps, some of the sketches on page 22 may help you design a support system for your 1980 sugar snap crop. Ms. Eikner of Kennett Square wrote "next year they [the sugar snaps] will be grown on a 10-ft. trellis of chicken wire," which will require 11-ft. metal stakes. Most people erect the wire and plant a row of peas on either side of the fence.

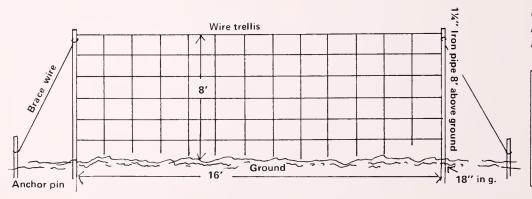
In response to my request, several gardeners provided additional cultural instructions for sugar snaps. Andy Graham of J. Franklin Styer Nurseries mixed two parts 5-10-5 with one part Earth-Rite soil conditioner (Zook and



1%" Iron pipe 8' above ground 18" in ground



22



Ranck) and placed the mixture in the row at time of seeding. Andy's crop was "prolific." Mary and Wilbur Zimmerman recommend using a fertilizer high in phosphorous. Austin Mims of Doylestown tilled a 3- to 4-in. layer of rotted leaves, 10-10-10 fertilizer and lime into the area in which he planned to plant sugar snaps. After the peas had made considerable growth he sidedressed the rows with additional 10-10-10. His peas (not surprisingly) grew quickly, and seemed to fall away from the 8-ft. trellis. Mims secured them with binder twine.

Enough sugar snap seed was sold in this country for the 1979 growing season to fill 51/2 boxcars. Almost half as much again went overseas to Japan and Europe. Next year the developer of sugar snap peas, Gallatin Valley Seed Company of Twin Falls, Idaho, plans to increase their distribution to seed suppliers by 50%. The bulk of this will go to home gardeners. At present sugar snaps are difficult for commercial growers to handle because of their height, but they are becoming popular in restaurants and gourmet vegetable stores. At \$4.00 a pound in a chic San Francisco market they probably represent a vegetable for the elite. Just think-you and I can grow as many as we please in our gardens for a fraction of that cost.

Grateful thanks for all gardeners who helped me with this article by responding promptly to my questionnaire.

RECIPE BOOKLET AVAILABLE

All-America Selections has prepared a book of sugar snap pea recipes. Send 50 cents to Paula Lion, All-America Selections, 1186 Los Altos Avenue, Los Altos, CA 94022. Please include a stamped, selfaddressed business size envelope with your request.

Jane Pepper is public information coordinator for the Horticultural Society. She and her husband Wing (who you may remember as Pepper the Pea Sheller in *Green Scene*, May, 1979) garden near Media.

where your gardening seeds come from

by Amalie Adler Ascher

Five hundred acres is a lot of ground to plant. What's more the stakes are high if crops are to produce a year's supply of salable seeds. But as manager Albers loses sleep over that. So much of the W. Atlee Burpee Company's seed production operation in Santa Paula, Calif.,* George Albers has developed a scientific approach to the job.

*W. Atlee Burpee headquarters are in Doylestown, Pa.

In his business, little things can make a big difference.

Like what the neighbors are growing. so that he visits them to find out in advance.

Suppose, for example, they planned to raise marigolds but of different varie-

continued



Each year billions of seeds are produced in the California fields and go all over the country in millions of packets. A few of these seeds have come to rest in the zinnia trial fields at Burpee's Fordhook Farms in Doylestown. David Burpee's residence in the distance.

where your gardening seeds come from continued

ties than those he would be growing in fields in the area. That would mean trouble, since the birds or the wind would be virtually certain to make their own crosses and ruin his carefully controlled, hand-pollinated hybrids.

To prevent such a catastrophe, he gives nearby homeowners some of the same seed he will be planting, or of other vegetables and flowers, or he invites them to come on over and help themselves to the pickings in his domain. So much for that problem,

Volunteers can be a real headache to a seed producer. Volunteers are plants that pop up on their own as a result of re-seeding or other natural causes among planned crops. They are definitely not welcome, since they are different from the group.

It is for this reason, in fact, that a crop is never repeated on the same

Tomatoes, for example, when over-watered, fail to set fruit. Better to keep them under stress while flowering and before fruit is set. "They can get by," Albers said, "with less water than you think."

ground two years in a row. (In the case of tomatoes that might bring on soilborne diseases, rotation takes place over a three-year period.) Rotating crops gives the seed a chance to break down.

The problem of volunteers could become even worse due to the high concentration of producers in the area were steps not taken to regulate it. Growers negotiate to ensure that plantings be spaced no nearer than a mile apart.

Still, roguing, or pulling out volunteers by hand, also called quality control, constitutes the greatest expense to a seed producer, Albers says, and continues up to the time of harvesting. On the other hand, when natural pollination is required, he rents bee colonies to guarantee that it occurs.

By and large, the day has passed when producers could grow their own seed. It's too expensive now. So local, independent farmers in 20 or 30 loca-



Above and at right, Bill MacDowell, president of W. Atlee Burpee Company, enjoys the benefits of Burpee's seed distribution in his own Doylestown garden.

tions, Albers said, do it instead. Contracts are awarded based on past experience, though 90% are repeaters year after year as a practical matter since the repeat growers are familiar with a company's crops and methods of culture. Sometimes the same grower works for more than one company. When that happens, he must be extremely careful not to cross-pollinate crops and thereby contaminate them.

"We must test for purity constantly," Albers explained. "Even though zinnias were to be followed by beets, for example, fields would still need to be rogued since volunteers of zinnias might come up again the next year. It's that second year that's the critical one, so we must watch plants unfailingly.

"Although outside farmers grow our seed, the work is carried out under Burpee supervision; we do our own planting, roguing, application of growth regulators, and harvesting. We're out in the fields twice a week looking at the crops and keeping contact with farmers. We also give them the dates

when the ground must be ready for planting."

started in greenhouse

A native of Wilhelmshaven, Germany, where he served his apprenticeship, Albers joined the Burpee Company 13 years ago, beginning as a greenhouse manager. During the winter he grew seeds for transplants, in summer roguing and assisting with harvesting. He thus became familiar with field operations and the methods of propagating hybrid and open-pollinated flowers and vegetables, in the first instance manipulated by man, in the second fertilized by natural means.

The amount of seed to plant is a matter for the sales and inventory department to decide. Needs are based on demand and supply on hand. Charts are kept showing average yield per acre per variety, which determines the acreage required per crop. However, Albers says, soil composition must be taken into consideration, since this can be altered by plants grown there before.



"We don't sterilize the soil," he said, "because it costs \$600 to \$700 an acre, though some mild herbicides are used. When we select ground, we always ask what herbicides have been applied previously. It's important to know that because the residue could kill the crop.

"Everything might start growing great, then as a result of residue, suddenly die. When we do resort to herbicides, it's for the purpose of reducing weeding costs, and then, we use only those registered for that specific crop."

Albers favors 16-20-0, which he says is a good all-around fertilizer to sidedress plants once they become established. He applies a minimum of 50 units of nitrogen an acre and as a pre-planting nourishment, 11-48-0 calibrated by the acre. The need for additional fertilizer is determined by the history of the ground, meaning what has grown on it before.

cultivation instead of mulching

Mulching isn't necessary, he says, because the land is being constantly cultivated. "Besides, if the price for a crop isn't right, we plow it under, adding enrichment. Also instead of mulching, we irrigate, but by furrow rather than a sprinkler system. All plants are grown in beds 30 in. wide in rows as

long as 1,800 ft., as short as 30 ft."

Watering is closely programmed at four to five irrigations during the growing season (March 15 to October 30), when there is little if any rain. For example, zinnias planted on May 15 and developing during this dry period to maturity August 15 would receive four to five waterings that might run as long as 24 hours straight.

There is a significant difference, Albers said, between plants seeded directly in the ground and those set from transplants. Direct seeded plants develop a longer tap root, which is not as restricted in its supply of moisture as are roots of transplants lying nearer the surface where the soil dries out more quickly.

Most people, Albers says, tend to over-water and thereby shut air out of the soil, which, in turn prevents a root system from developing. This also causes leaching of nutrients, plants become weakened and produce vegetative growth or foliage rather than fruit or flowers. Tomatoes, for example, when over-watered, fail to set fruit. Better to keep them under stress while flowering and before fruit is set. "They can get by," Albers said, "with less water than you think."

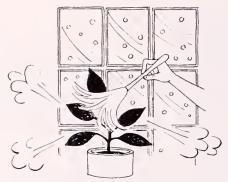
"What it takes to grow things is

plain, common sense. You don't have to go by the books, necessarily, but rather learn by doing." When the soil has dried out sufficiently on top, he says, cultivate to break the crust. That seals in moisture. When soil cracks, moisture is released. A single cultivation is as good as two irrigations in heavier soil. On established plantings, cultivating accomplishes two purposes: it suppresses weeds and preserves moisture.

Turning to other problems, Albers says, "There are sprays for mildew on cucurbits and zinnias, and controls for insects, but for wildlife there is only fencing. You should see the size of the jackrabbits out here!" he exclaims in disbelief. "When pesticides are required, we call in specialists."

In recent years, control of the Burpee Company has passed from the family to conglomerates. In the last few years, it has been owned by General Foods, and in late summer was acquired by an International Telephone and Telegraph subsidiary, O. M. Scott & Sons (lawn and garden products) division.

Amalie Ascher is a frequent contributor to *Green Scene*.



Don't Let February Forgetfulness Foul Your Flora



The period of time between January 1 and February 28 covers a wide range of growing conditions for the Delaware Valley gardener. The temperature can plunge to sub-zero and then soar to above 50°. The dark, grey days of December slowly have given way to periods of bright welcome sunshine that will continue to increase in the months ahead. Both indoor and outdoor plants that have seemed sterile and lifeless for several months start to show new signs of growth.

Unfortunately, many of us take our plants and gardens for granted at this time of year. The changes taking place are often so slight that we remain unaware of them for prolonged periods of time. January and February are not the months to take a vacation from plant maintenance; they are critical months for your plants' health.

Now is the time to carefully check all of your house plants for disease, insects and accumulated dust. Ordinary house dust, tobacco, fireplace smoke and cooking vapors accumulate and block the leaf openings that permit breathing and transpiration. Wash the leaf coatings with lukewarm water and a little soap; rinse with clear water.

As the days lengthen plants will start to produce new growth and signs of bloom may appear. Start fertilizing regularly when bud growth begins, usually in early February. Plants that are grown under lights are fertilized throughout the year because they are provided with enough light to properly conduct photosynthesis. Remember that the smoke and dust also coats the light units' tubes and reflectors and now is a good time to take a damp cloth to these fixtures. Disconnect the electrical cord before wiping the fixtures.

Although summer is still six months away now is the time to start some of the annual seeds that will provide a splash of color next July. Begonia and

seed geraniums should be started now for early summer bloom. The top of the light unit is an excellent shelf with built-in bottom heat on which to start the seed pans.

If you have been keeping nonhardy bulbs, corms, or tubers over the winter, check them for rotting or other problems. If the corms or tubers show signs of rotting it may mean that they have been exposed to too much

The secret to successful coldframe gardening is controlling ventilation and temperature. Remember that even on very cold days bright sunlight can cause the temperature to rise rapidly in a closed frame.

moisture. A sulfur dusting and some extra ventilation will help remedy the problem. On the other hand, if the stored material seems excessively dry and shriveled moisten the storage medium a little. The corms and tubers can be started near the end of February in boxes or flats of peatmoss if you have the room inside. A sunny location with a night temperature of 50°-60° would be perfect for giving you a jump on the growing season. Be sure that you do not set the plants outside while there is still a chance of frost or all of your work will have been in vain.

The outside garden also needs some checking during the late winter months. As the days lengthen and the temperatures rise during the day it becomes more important to watch your cold-frame closely. The secret to successful coldframe gardening is controlling ventilation and temperature. Remember that even on very cold days bright sunlight can cause the temperature to

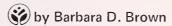
rise rapidly in a closed frame. The temperatures drop quickly in the midto late afternoon as the sun lowers in the sky. It is extremely important to open the frame before the temperature rises and to close it before the temperature drops. A range between 40° and 60° is about the maximum that the plants can tolerate and still remain in good condition. Much higher temperatures during the day will tend to weaken the plants and extremely cold night temperatures following mild days may cause severe setbacks.

The insects may not be swarming outside at the end of February, but it is the time to start thinking about the initial stages of control for many of the pests that can cause damage later in the season. Dormant oil sprays, made from a petroleum base, are one of the best means of control but they must be applied at the correct time. These sprays are used to control many pests capable of surviving the winter in our area and should be applied in the early spring before the plant shows any sign of new growth. A temperature range between 45° and 55° is ideal for application. Dormant oil sprays are not recommended for all types of plants. Be sure to check the manufacturer's label and follow the directions carefully.

January and February may be the months to sit beside the fire and order seeds from the ever enticing catalogs, but they do not excuse the gardener from preventive maintenance. Just as you order the seeds anticipating a lovely flower garden and bountiful harvest so you should also consider the pest and disease problems that will pose a threat to your gardening rewards. Don't let forgetfulness cause you regret, but let your foresight ensure success with your plants both indoors and out.



KEEPING ROVER FROM ROVING



front of it. Picket fencing can be used

The reasons for keeping canines suitably confined in outdoor areas are numerous, not the least of which is the good will of the neighbors. Most of our more built-up residential areas have leash laws with stiff fines for those who repeatedly ignore them. These aren't always enforced, however, and as space becomes more and more limited the need for such enforcement will become increasingly necessary. Even in open suburban areas this law is needed. Few things disturb those concerned with wildlife more than seeing somebody's dog with a bobwhite hanging from its mouth. Our birds and small mammals have a hard enough time obtaining suitable living space without worrying about which way to jump should Rover appear on the scene.

The only alternative: Set aside a proper spot in the yard for the dog. There are a number of considerations to be explored in selecting the location for his run or exercise area.

First of all, how big should it be? That, of course, depends on the size of the dog and whether he will live in the run at all times or just be there occasionally for exercise and fresh air. The minimum, according to the American Humane Association, is 10 ft. x 20 ft. I feel that for a medium sized dog 20 ft. x 30 ft. would be more comfortable if your lot size permits. Naturally, the run will require fencing. Here again, there are a number of possibilities. Although not too attractive, chain link fencing has to be the strongest. It can be camouflaged by covering it with hardy vines. There is also a black vinyl covered chain link which becomes almost invisible especially if shrub groups are spotted here and there in

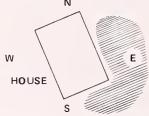
successfully, notably the cedar variety either with a rough finish or smoothly sawed. This picket type of fencing comes with either 2-in. or 3-in. spacing between the pickets and has a plus:

Rover can see out and know that his family is close at hand. All of these types of fencing come in 4-, 5- and 6-ft. heights. Unless you have a regular pole vaulter, the 5-ft. height should be fine. Then we must not forget those breeds that are known diggers such as fox terriers, German shepherds and continued

Thirty feet seems a "safe" distance to position the dog run from the house and preferably downwind from it.

although I don't think normally considered a digger, a golden retriever that I have definitely falls into this category. For these dogs it would be wise to add wire mesh 1 ft - 1½ ft. under the fence which also keeps rodents from digging into the enclosure.

Now then, where do we locate the run? The occupant's comfort as well as the needs of the persons involved should be kept in mind. Thirty feet seems a "safe" distance to position the dog run from the house and preferably downwind from it. Since our prevailing summer winds come out of the southwest, if at all possible, a spot in the northeastern or southeastern quadrants would be best.



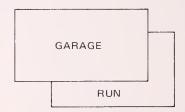
Shaded area shows where to locate run

One more step that can be taken to prevent odors from reaching the house or outdoor living areas is to make use of fragrant plants between house and run. These coupled with chlorophyll's natural odor eating tendencies should be sufficient to keep your dog area pleasant. Regular cleaning is taken for granted.

Some sort of protection from the elements is needed: sun, wind and rain. Deciduous trees are effective; they afford summer shade while permitting the dog to benefit from winter sun. Incidentally, the sun should be allowed to reach the run for at least a brief period each day even in summer because the ultraviolet rays act as a purifier and germ killer. On the northwest side it is advisable to set up some sort of windbreak since our winter

winds come from that direction. Evergreen shrubs or trees can take care of this job nicely. Some part of the run should be kept dry at all times. It can be partially roofed or, if Rover is outdoors full-time, his dog house can serve the purpose.

The fence that surrounds the dog area can partially screen it from your home and outdoor living area. It will need some help, though. Several groupings of medium to large evergreen shrubs would work well especially if staggered. Vines grown over the fence give some shade as well as hide it. A sort of lath house could be constructed over part of the run for shade and screening. Deciduous flowering shrubs combined with evergreens would work for summer and winter. You could use fruit trees with low evergreens underneath to break the sight line. Any combinations of these ideas would also work well. If you have a detached garage or other outbuilding, you could locate the run on the side away from the house, automatically putting it out of sight. You could also make the run L-shaped around two sides of the building thereby cutting down on your fence cost by using both sides of the building in place of fencing.



Now to the real nitty gritty. Which plants can tolerate the ever present uric acid and its salts that close proximity to the enclosure mean? Surprisingly, there are a fair number that can survive these conditions and undoubtedly

many that I am not aware of.

Evergreens:

Pinus montana - Mugo pine
Picea pungens - Colorado spruce
Pinus nigra - Austrian pine
Taxus cuspidata - Japanese yew
Ilex crenata - Japanese holly
Pinus thunbergiana - Japanese black
pine

Deciduous material:

Elaeagnus angustifolia - Russian olive Caragana arborescens - Siberian peashrub

Hippophae rhamnoides - common seabuckthorn

Rhus typhina - staghorn sumac Ribes alpinum - alpine currant Rosa rugosa - saltspray rose or rugosa rose

Symphoricarpos albus - snowberry

About the best vine to use is Virginia creeper, Parthenocissus quinquefolia. There are a couple of other vines that can be used, but I don't think they are as reliably hardy in this situation as the Virginia creeper: clematis hybrids of which there are so many, plus Clematis paniculata, Clematis virginiana, and climbing hydrangea, Hydrangea petiolaris.

To make the fence a little more difficult to reach, some kind of curbing might be installed just inside it. If you decide to try the vine route I'm sure the vine would benefit from this additional precaution. Further away from the fence any plant could be used.

Now, there's no reason why you can't have your dog and your garden too.

•

Barbara Brown is a landscape design student at Temple University, Ambler Campus. Formerly she worked for the USDA in Beltsville, Maryland. She has been volunteer naturalist guide at Ridley Creek State Park in Media. Brown is a past president of Heritage Gardeners and cochaired the 1975 PHS Christmas Show.

The black, wiry-stemmed Maidenhair species shows tightly-furled, bright-red fiddleheads, almost invisible against its background of mature fronds.

Shocking pink is the color of the almost-unfurled fronds on the Hacksaw fern, Doodia caudata

February is Springtime in The Fernery



by Marilyn B. Peterson

Nature made ferns for pure leaves, to show what she could do in that line. -Henry David Thoreau

A full month before the outside world begins to blossom forth, the Fernery at the Morris Arboretum in Chestnut Hill is showing its spring colors.



Encouraged by the strengthening sunlight and gradually warming interior temperatures, a crop of multi-colored fiddleheads begin to show themselves as early as the third week in February.

This re-awakening is the culmination of several months of dormancy for the arboretum's tropical ferns. Beginning

In winter, the Japanese climbing fern is cut to the ground. I was terrified that I might kill the priceless plant and crossed my fingers until winter was over, and I could see new growth in the ground.

in October, many start to lose their fronds or get "dormancy markings."

By mid-December, the Fernery looks barren. On some plants, all that is left are their rhizomes and roots. Others keep a few sterile fronds over the winter, but do not send up new growth.

I first noticed this dormancy, or rest period, in ferns three years ago. Since I had never before had the opportunity to view ferns in a naturalized greenhouse setting, I had assumed that I was causing my ferns to "die" over the winter in my house. I had even thrown away some, believing that they would never revive.

As a volunteer in the Fernery, I went through that winter with much trepidation. "Just prune them back," the arboretum's propagation expert told me. "They'll come back up in the spring."

So, I pruned and pruned. The most



The fiddleheads of the tree-fern, Sphaeropteris cooperi, reach out a beckoning hand across the pathway in the Fernery.

devastating day came when it was time to cut back the manigicent Lygodium japonicum, the Japanese climbing fern. This fern climbs ropes for a distance of about eight or nine feet, from its pot to the top of the Fernery. In winter, it is cut to the ground. I was terrified that I might kill the priceless plant and crossed my fingers until winter was over, and I could see new growth in the ground.

Meanwhile, I began reading about dormancy in ferns by getting several gardening and fern books from libraries

and bookstores. To my dismay, I found very little.

What puzzled me was that the books claimed that dormancy was caused by cold and the Fernery is heated to the same temperature year-round, except for the solar heat that builds up.

In the Fernery, the plants' reaction of going into dormancy seemed to reflect the lessening of light, or the lesser quality of that light. After talking to some friends in the Indoor Light Gardening Society, I found that ferns grown under indoor lights do not go



The magnificent *Belchnum brasiliense* shows its new pinkish-brown fronds amidst a backdrop of older fronds.

dormant quite as strongly as others. Some members reported no obvious rest period at all for their plants.

My experience with dormancy in the Fernery taught me several things. First, I found that some ferns go more dormant than others and are, therefore, less attractive over the winter months. These included Adiantum (maidenhair) varieties, many Pteris (brake fern) varieties, *Polypodium aureum* and *Diplazium esculentum*.

Others, like the many Nephrolepis (sword and Boston) fern varieties, lose

their pinna somewhat like an oak tree loses its leaves. That can be a messy proposition.

One woman I know who enters ferns into the Flower Show has solved her problem with winter dormancy. She cuts her maindenhair ferns back in August, forcing them into dormancy, and they look beautiful enough to win ribbons all winter long.

Another thing I learned is that dormancy, and the resultant lack of fronds, helps us to do the necessary "housekeeping" on our plants. That is

when we can see enough of the plant to clean out old fronds and make sure the pruning is down to ground level.

Then, in the spring when the very tender new "fiddleheads" appear, they have plenty of growing room. Also, by pruning before the new growth appears, we run much less risk of damaging these young fronds by accidentally bumping them with our shears.

We've also found that just at the end of this dormant period is the perfect time to divide the ferns or transplant them. The energy that they have stored over the winter enables them to get a good fresh start in their new place.

The beginning of new growth is also a reminder to start fertilizing your ferns again and to increase their watering. Plus, it tells you that the sun is stronger and, if the plant is in a sunny window for the winter, it should be moved to a shadier location to prevent its leaves from being burned.

Even more welcome than the first crocus are the signs of new life in the Fernery, mainly because it is happening while there is (at least in recent years) a foot of snow still on the ground. And, the ferns certainly rise to the occasion. Their spring colors are bright reds and pinks, blue-greens, whites and yellow-greens. It's a nature lover's paradise, while the rest of the world lies still sleeping.

Marilyn Peterson has volunteered in the Morris Arboretum Fernery for several years. A past president of the Delaware Valley Fern Society, she co-chaired the arboretum's award-winning exhibit, "Ferns: Energy Producers," at the 1979 PHS Flower Show. She has served for two years on the Passing Committee of the Flower Show and is known to Philadelphia *Bulletin* readers as a gardening correspondent.





primula obconica

Primula obconica is a spectacular winter flowering house plant that can be grown easily if certain conditions are met. For several years I have grown these beautiful plants from seed, starting new plants each year. I start the seeds in June or July and flowering begins in December or early January and continues until June. Plants saved over the summer are usually not as vigorous as new seedlings.

Seeds are sown in small flats in Jiffy Mix and are watered by soaking. Soaking should be the only method of watering until the seedlings are wellestablished as the seeds are very small. The flats are placed in a cool basement under fluorescent lights that are timed to burn 16 hours a day. The seedlings usually emerge in three weeks and grow slowly for the next month. When they become crowded, I divide them and set them back into flats again, principally for the ease of watering. They could be put in 2 in. or 3 in. pots.

By late September or October the plants are large enough to go into their permanent 4-in. pots and new location, which is a cool (45°) greenhouse. I have also had success growing these plants continuously under lights, but they must stay cool, preferably below 60°. A cool basement or windowsill with

lights would work. The soil mixture at this point should be carefully chosen. Good drainage is extremely important or the tiny fibrous roots will rot in the dark days of the winter. I use equal parts of compost, sand and Terra Green or perlite.

The primroses are then lined up on the greenhouse bench and I wait for the first buds with great anticipation. In the fall they are in full sun. When snow lays on the ground, the bright sun of February and March can scorch the leaves, so shading or newspapers are a help at this time. The plants are given a weak dose of Peters fertilizer every time they are watered. Once the plants start blooming, they can be brought into a sunny windowsill in a warm house with no problems. They seem to need to be cool to set their buds.

Recommended varieties are 'Louvre,' a pale salmon pink; 'Carrousel,' a darker salmon; 'Bleu de Paris,' a midblue; and 'Trianon,' white. Seeds are available from French's, Route 100, Pittsfield, Vermont 05762.

Susan P. Wilmerding

Susan Wilmerding has attended Temple University, Ambler Campus but has not yet completed her studies in horticulture. She exhibits primroses in the Philadelphia Flower and Garden Show every year.

echeveria x imbricata

I have never grown succulents; until now I haven't had the luxury of windows with a southern exposure or unshaded garden space. A move to a city row house with a two-story high flat roof provided me with the gardening conditions I had always lacked. So when someone gave me an overgrown pot of *Echeveria* x *imbricata* after the Flower & Garden Show, I added the potted cuttings to the group of sunloving house plants and annuals I was growing for the first time.

I first cut four small rosettes approximately one inch in diameter with one and one-half inch stems, removing all but the tight cluster of five or six leaves at the stem tip. I allowed the ends of the cuttings to callous overnight. Selecting an 8-in. clay bulb pan with a drainage hole as the home for the echeveria rosettes, I prepared a planting medium of 50% sand and small gravel, 25% peat moss, and 25% commercially prepared potting soil. I knew the plant and some other succulents on the root would be exposed to the often soggy Philadelphia summer, so I felt excellent drainage

was essential. The summer of 1979 bore me out on this one.

After the cuttings developed root systems under my light unit, I moved them to their outdoor perch on the roof in mid-May on an upended cinder block. They received seven hours of direct sun daily. Then I settled into a regular maintenance routine for the next two and a half months. When it didn't rain, I doused the plant with water every two days (I hardly watered in July) and fertilized with a full strength dosage of 18-18-18 soluble fertilizer every three weeks. The plant was rotated when I rememberd to do it.

By mid-summer the four rosettes filled two-thirds of the pot. Each had flattened somewhat to become very saucer-like. The leaves were tipped in red and the glaucous bluish-grey bloom was unblemished. I took extreme care that I or my guests resisted the temptation to touch or mar the leaves. And small offshoots peeked out from under the lowest leaves of two of the rosettes.

Eyeing it as a potential Harvest Show entry, I placed large white stones

over the visible soil to highlight the plant's color. And its fertilizing schedule was increased to full strength dosage weekly. Its response was better than I had hoped. In one month, my artistically arranged stones were completely hidden by the four swelling rosettes and three offshoots. They slowly squeezed and crowded and mounded in the pot. By Harvest Show time, eight rosettes were just beginning to clear the lip of the bulb pan. Looking at that pot of Echeveria x imbricata, I realized how opulent and magnificent succulents could be. I suppose the judges liked it, too. It won a blue ribbon in its class.

The plant is now in my south-facing greenhouse. I eagerly await its floral display of pastel orange spikes sometime early this spring.

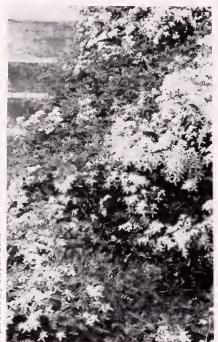
J. Blaine Bonham

J. Blaine Bonham is director of Philadelphia Green, PHS's urban outreach program. See reference to his roof greenhouse in the story on solar greenhouses on page 7 of this issue.



the green scene • jan. 1980





clematis paniculata

When the old wooden porch at the back of our bungalow proved unsatisfactory my husband and sons decided to tear it down and build a cement patio in its place.

They agreed, however, to wait until I transplanted the sweet-autumn clematis that was growing around it.

This plant is one of my favorites. Its flowers are as delicate as lace and the fragrance is lovely. The dark green, glossy, heart-shaped leaves are beautiful, even when the plant is not in bloom.

There were about 10 plants, and I had to prune them somewhat as they had been growing up the pillars of the porch. Then I walked around the property, looking for an appropriate place to put them. What better place than the front bank?

Here the soil had washed away when we first moved in, and I had been trying to build a rock garden there over the years. That had proved difficult, partly because of the steep angle of the bank, and also because of the huge maple tree at the top. This tree was surface rooted, and of course bled the garden of moisture and nutrients.

But the bank and the tree met their match in the clematis.

Slowly, but surely, it dug down, down, down, under rocks and tree roots, finding a foothold and spreading until now it covers the bank, a lovely blanket of green and white.

At the time I planted it, I used a sharp weeding tool to make small crevices in the bank, wedged the roots in tightly, then after watering, packed top soil firmly about the plants.

Now that it's established it dies down in the winter. In the spring I prune it if the strands grow too long.

Helen McGarry Molineux

Helen McGarry Molineux, of Collingdale, has been writing and gardening since childhood. She's published two books of poetry and is working on a third.

letter to the editor:

Among the many free horticultural services available to residents of this area is a monthly single-page publication, called *Gardeners Want to Know*, put out by Paul N. Reber, county extension agent for Montgomery County. In it are suggestions, information, and timely hints for indoor and outdoor gardeners.

A recent issue gave growing instructions for Christmas cactus, which were somewhat unusual. Mr. Reber explained that these plants may be brought into bloom without resort-

ing to the short-day technique we have always been advised to use. His suggestion is to keep the plant at 50°-62°F, to get the blossoms to set; the temperature, rather than the lighting, is the important factor. He also advised keeping the plant watered all year long rather than giving it a resting period.

After reading that I understood why the Christmas cactus in the house next to mine flowers profusely on one side only. It is in a deep bay window facing northeast. In winter, the

part of the plant facing the window is colder than the side facing the room; therefore, only the window side blooms. The lights that are on each evening in the room have no bearing on the plant's blooming.

The November-December issue of *Green Scene* with Jan Riemer's article about her Christmas cactus gave the traditional instructions for flowering these plants. I thought readers who have no long-dark-night facilities for their plants

would appreciate this alternative method. An unheated sunporch, cellar window, or even a garage window may be all you need to get your Christmas cactus to bloom.

As for me—I have neither long-dark nor extra-cool places in my house suitable for such plants. I'll just enjoy looking at yours, regardless of the method you use to get them to bloom.

Phyllis Simpson Philadelphia

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Children and gardening: Is it caught or taught? See story on page 13.









8

THE

green scene

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Front Nigella damascena with old roses and the yellow Cover: foam of lady's mantle. See page 5.

photo by Barbara Bruno

Back Aquilegia sp. See page 30.
Cover: photo by L. Wilbur Zimmerman

Alexander Crosby died in February. We'll miss him. A man who cared about writing and plants equally, his warm, witty and wise contributions to *Green Scene* were valued. We were fortunate to have him on the Publications Committee for the last two and a half years.

Cultivating Rarity... Good Business or Selfishness

More on Baraflora II

To the Editor:

Reading Betsy Shuman's article on the fate of Raraflora in the January Green Scene, I weep, as I did one bright golden afternoon last November, when I was present at that poorly attended auction. I weep not so much for the fate of the plants and the grounds, for that indeed, seemed inevitable. The \$500 deposit to procure the right to bid precluded many of us who cared, but had modest pocketbooks, from participating that day. My despair for the living plants, totally at the mercy of those who would milk them for their ephemeral financial value, was overridden by despair for that segment of mankind who fall prey, not to the disease of power, but to the disease of rarity: a different illusion altogether, but equally devastating in consequence.

One can collect objects-crafts made by people. One collects for fascination, love, or for financial investment—or all. One does so knowing that the enjoyment is limited by mortality, that "you can't take it with you." Yet how many times, especially around this wealthy city, do you come across the enormous collection of Chinese export porcelain, or American pewter, or moustache combs, being amassed for selfish gratification with nary a thought for what later becomes of it? In the case of living things, especially plants on estates, the problem is compounded by the very fact that the collection is livingand mortal, that it must have roots in solid earth or pots. The attachment to the land compounds the problem when the proprietor wants to remain in control, wants to leave relatives something of worth (land to be subdivided after the plants are removed!), yet continues the same life style, thus, perhaps, curtailing any kind of maintenance trust.

I am angered at the attitude that it is essential to keep the rare plant rare, huddled in obscurity behind hedges and dogs for the very sake of its uniqueness, and the fame that brings its owner. Had all the great plantsmen of the 18th and 19th centuries hoarded their finds in tight little guarded greenhouses, think how lacking our ornamental plant world would be today. What of all our present endangered native species, many of them no longer found in their

Had all the great plantsmen of the 18th and 19th centuries hoarded their finds in tight little guarded greenhouses, think how lacking our ornamental plant world would be today.

native habitat, but some scattered in small arboreta, foundations, or private estates? In many cases they remain Ione specimens, subject to death from weather, disease, pests, and man's mishandling. Like the owners of Raraflora, the people who delight in unique specimens for the sake of their rarity (without recognizing the ultimate responsibility to future generations of plant lovers) fail to understand that stewardship is inherent in the responsibility of ownership. Stewardship of a fortune, be it in art objects, or thoroughbred animals, or rare plants-means one thing: responsible care both now and for the future, including proper records of acquisition, location, multiplication and dispersement (in case of living things), and eventual future ownership, with provisions for financial management. Plant owners who fail to plan

Elizabeth Hume is an alumna of Barnes Foundation School of the Arboretum. For two years, she directed a horticultural therapy program at Liberty Forge School in Phoenixville, Pa. At present she is a horticultural consultant.

ahead in this manner need to remember the first and best lesson gardening ever taught any of us, that is to share, to give. It is only through this open attitude that the continued viability of a species can be insured and handed down.

No, the Bergmans could have done it differently. I remember when an estate in Penn Valley was broken up and subdivided and all the magnificent azaleas that could be moved, were removed to a small community park. The larger old specimens remained and became an integral part of new smaller yards, providing instant enjoyment and value for those moving in. What were moved to the park provide an annual spectacle and labor for a dedicated garden club in Merion. For those with large incomes, the very least they can do is take a tax benefit from giving or willing their prizes either to responsible individuals, institutions, or community organizations capable of recognizing the worth and caring appropriately. Even the smallest place can become a pocket environmental learning center-for young persons, elderly deprived, or disabled people. As our population becomes more dense, the need for green spaces will intensify. The caring steward of land and a good collection should research the needs of both the immediate community-township, nearby colleges, church groups, and the larger community, checking with local and regional planning boards. Thorough understanding of intentions and a contract commitment on the part of the giver and receiver should bring peace of mind, and the assurance that wishes will be carried out.

In the Orient, unique specimens of bonsai culture have been handed down through centuries, generation after generation venerating the inheritance with infinite care and stewardship. Can we not learn this lesson?

> Elizabeth Hume Penllyn, PA



Salvia farinacea grows with cheerful zinnias.





Plants that are seeded and that bloom in the same year are great favorites with many gardeners. These annuals give quick results, their great burst of color blanketing new flower beds in short order. In established gardens these abundant bloomers are welcomed to fill bare spaces and to provide color when perennial plants flag. Seed catalogs list dizzying numbers of annuals. The diversity in flower shape and color is staggering, and plant size varies from diminutive to gigantic. There is an annual to fit almost any situation and soil condition if it is provided with their one common requirement-sun.

All too often gardeners choose the same few varieties from the seedsmen's lavish offerings. These old friends are tried and true, but many lesser known annuals are as dependable and have unique characteristics that can turn a run-of-the-mill planting into one of unusual charm.

elusive blue

One of the rarest and most telling colors among garden flowers is blue. A few blooms of sky blue azure, rich sapphire, or gray misted Spode blue are a welcome addition to any color scheme whether it is one of sunny yellows, pastel pinks, or vivid reds. I try to have some blue hued flowers included in my plans for every season and depend heavily on annuals to accomplish that. Fortunately, I can choose from a number of lovely, but

Unusual Annuals for the Flower Garden

continued

by Barbara Bruno

Unusual Annuals for the Flower Garden continued

easily grown flowers.

If I were asked to name my favorite annual in any shade it would be Nigella damascena, love-in-a-mist, of clear blue blooms delicately embraced by the finest filligree of green threads. Its flowers arrive at just the right moment to complement the pastel showers of old roses or combined with the contrasting yellow foam of lady's mantle. Alchemilla vulgaris, they look even lovelier. Fall germinating seed provides the most vigorous, floriferous plants, which survive all but the most bitter of winters on well drained soil. After bloom, decorative inflated seedpods form, stained with vinous stripes and still coquettishly wrapped by the feathery involucre.

Just as the blue eyes of Nigella are winking their last in late June, tall spikes of larkspur, Consolida orientalis, paint the garden in splashes of a resplendent indigo-purple, which serves as blue in this time of robustly tinted bloom. It makes a fine color contrast massed behind brilliant orange daylilies and lavender or, combined with the pale yellow of Achillea 'Moonshine,' it cools the brassiness of the season's golden daisies. Again, look for a blue color selection rather than a mixture, or if the single hue is unavailable, plant a mixed packet and roque out all unwanted colors as they appear. Since larkspur will obligingly reseed, eventually you will have a stand of rich color.

I started growing *Echium vulgare* after admiring it in the herb garden of a Society member. No doubt longing for the richer loam of a Pennsylvania garden, it does not grow in the Bridgeton (N.J.) area with great vigor, but it is still quite pretty in a wild, old-fashioned sort of way. Its small but numerous flowers scattered along hairy stems are much loved by bees. Choose the blue or try the mixed hybrids in sugary, pastel tones grading imperceptibly from pink through lavender to sky blue and engagingly described as "bee's paradise."

Cornflowers, Centaurea cyanus, are not uncommon flowers, but sometimes we need reminding of the merits of neglected old dears such as these. Corn-

flower blue describes the rich distinctive tone that stands out clearly and brightly in the garden. Just a dash of it in the spring border and all colors take on new life. On well drained soil the earliest and most vigorous plants are to be had from sowing the seeds in the fall; spring planting will bring a succession of bloom. A clump of strong blue is to be preferred in the garden to the

One of the rarest and most telling among garden flowers is blue.

confetti effect of mixed shades. Cornflowers are available in a dwarf form with flowers in a clump or in a tall, older, more graceful variety.

The heavenly color of skies and seas and baby blue eyes continues in the midsummer garden in the guise of mealy-cup sage (Salvia farinacea). This half hardy annual with innumerable, fragrant spikes of small flowers is offered in several blues, varying from pale Wedgewood to a rich, velvety, royal hue. The heavier spikes of recent hybrids colored in the same vibrant tone as the blooms are showier. Combine the salvia with late blooming daylilies in pearly melon tones, or pair it with daisies, dahlias, or the brightest shades of zinnias, and you will find that it unfailingly enhances any flower with which it grows. A favorite with bees, a soft, sweet fragrance clings even to dried stems used in winter flower arrangements. It adds the grace note of true blue to the garden well into late fall, constantly increasing in loveliness until a hard frost cuts short its display. but here, where chilling moisture never stands, this Texas native will winter over to bloom longer and even more abundantly next season as likely as not.

old favorites in new dress

At one time or another most of us have grown nasturtiums, zinnias, and marigolds. This year why not try one of the more unusual members of these popular clans?

Even without bloom the variegated Nasturtium 'Alaska,' with leaves splotched and dashed in creamy white, catches the eye. When it finally hangs its multihued lanterns above the bicolored foliage they seem twice as brilliant as those decorating an ordinary plant.

Zinnia angustifolia (Z. linearis of catalogs) is a cat's cradle of wiry stems sprouting linear leaves and dotted with plentiful, golden-orange daisies of cheerful demeanor. Each flower petal is neatly striped in delicious lemon, creating an optical version of orange marmalade.

Another favorite, Tagetes tenuifolia, the signet marigold, is the progenitor of a heady, perfumed lemon scent released by the slightest touch to the foliage. To me, its refreshing bouquet is the plant's most prized attribute. I also value the neat mound of ferny foliage, starred by late summer in countless, small blooms that make quite a show. The dwarf cultivar Pumila is offered in several shades, among them, an astonishing tangerine red called 'Paprika,' but the citrusy yellows and oranges are easier to work into the garden scheme.

colored leaved annuals

Perilla frutescens 'Atropurpurea' and purple basil, Ocimum basilicum 'Purpurascens,' are both culinary herbs useful in the flower garden where the contrast of burgundy leaves would be welcome. Although it has similar value in the garden, Perilla is much the easiest to grow and maintain. It is larger and showier, and once plants are raised and seed formed you can be sure of a more than ample supply of self-sown seedlings in future years. Waved and notched leaves add texture to the garden. The warm brown seed spikes, strung with tiny calyx bells, remain attractive late into the fall.

For best effect, thin the clumps of seedlings and remove the helter-skelter plants popping out all over the beds. The temptation is to leave too many of these pretty seedlings dotting the border, thereby losing the striking effect of a single, deep burgundy clump. Once the hordes of unwanted seedlings have been dealt with *Perilla* needs little



care, an advantage for the busy gardener when compared with the constant pinching out of bloom spikes needed to keep purple basil shapely and producing new growth. Perilla will also grow in partial shade, but unless placed against a lighter toned background the shadowy leaves are barely discernible. It is late summer before the clumps are seen at their best. With that in mind use it with gay, summer daisies, to complement late blooming daylilies of the peach, pale yellow or bronze varieties, or for autumn beauty, grow it with silver leaved plants and frame the grouping with a lavender wreath of tall asters.

delicate treasures

Silene armeria, sweet William catchfly, is a pretty, old-fashioned plant bearing heads of tiny, five-petaled flowers in a brilliant raspberry pink. Seed sown in early spring will bloom abundantly, just in time to accompany old roses and foxgloves, but once established, flowers are to be found at any season. (I write this in November with a sprig of its pert buds and cheerful bloom on the table before me.) While placing this raspberry pink needs thought—reds and oranges should not hobnob with it—any pastel flowers are most flattered in its presence, and it combines especially well with gray leaved plants. One year it self-sowed around the base of a majestic, silver thistle creating a particularly lovely picture.

Another willowy annual is *Linum grandiflorum*. This lithe member of the flax family balances wide-eyed bloom "the color of red wine held up to the light" on graceful, erect stems clothed sparsely with small linear leaves. Easily rasied from seed sown early in spring, it is reputed to self-sow freely. Regrettably, that has not happened here so far, but I'll continue to try to make a home for it since its gypsy color adds such a dash of spice to the garden.

Dyssodia tenuiloba is a small gem of a plant that would be as much at home in the rock garden as it is here among the ground hugging thymes. Dahlberg daisy is the sobriquet given this mound of delicate, ferny foliage topped by blossoms the color of liquid sunshine. The ½-in. flowers are plentifully produced over a long period and make quite a show despite their diminutive dimensions. This plant can be used to good advantage as sunny edging to sedate shrubbery verges or to blanket sleeping spring bulbs.

golden poppies

As a lover of poppies in all their various guises I was delighted to discover two sunny, summer annuals bearing the magic, cupped blooms of ephemeral delicacy that proclaim, "I am a poppy." Both are American wildlings which, having attracted the attention of early botanists, were soon rubbing blossoms with more genteel denizens of the world inside the garden gate. Indeed, the first of this duet with which I made acquaintance bloomed

for Thomas Jefferson at Monticello, and it was there that I admired and bought seed of Argemone grandiflora. This Mexican native with scalloped. thistlelike leaves is armored with fearsome needles inspiring its descriptive pseudonym, prickly poppy. The sating, yellow flowers centered with a ring of stamens soon flutter away, but others are always delicately unfolding their crinkly petals to take the place of spent blooms. Seed of A. mexicana is more easily secured. It is a similar species with glaucous, deeply lobed leaves penciled in pale veining and ornamented with devilish prickles. Above the leaves clear yellow saucers reflect the summer sun.

The cupped, golden blooms of *Hunnemannia fumariifolia*, the Mexican tulip poppy, bears a resemblance to those of its cousin, the California poppy, but a frame of rich, glaucous fringe composed of finely divided, blue-green foliage makes these four-petaled, citrusy blossoms appear particularly clean and refreshing under a cloudless, midsummer sky.

Here are just a few of the seed catalogs' worthy offerings. The pleasures these lists extend to the adventurous gardener are many. First, the engrossing task of combing diverse inventories for unusual varieties. Then, as we peruse the vast world of horticultural references, we run the risk of becoming ensnared in the enchanting web of the green world's facts and fancies, Historical allusions and illuminating snatches of information lead us deeper into the maze, so that, before we know it, time has fled and we have learned more about the green and growing universe. After these delights comes the arresting task of encouraging the new garden finery through the sunlight and showers, heat and chill of its yearly cycle. I urge you, then, to expand your gardening enjoyment by considering a few of the lesser known, but meritorious annuals.

Barbara Bruno is a frequent contributor to *Green Scene*. She is working on a book about herbs in the garden.

Tree Wisteria



The finished product. Garden of Mrs. W. K. duPont, 1964.

A tree wisteria is a vine that has been trained to grow like a tree. It never occurs naturally. Its existence depends on the skill of a caring gardener. It is created by the art of pruning. It is really a piece of living sculpture, and can therefore be classified as topiary. Most topiaries, however, are grown for their foliage and form only, whereas tree wisterias are grown for their spectacular blossoms as well.

I first encountered tree wisterias in the garden of a very distinguished gardener of my grandparents' generation here in Wilmington. Mrs. William K. duPont, during her garden years at "Stillpond," had created several "trees" 10 ft.-12 ft. in height and 10 ft.-15 ft. in spread. There were pinks, purples and whites, and they were all the long-flowered, fragrant Wisteria floribunda. They were breathtakingly beautiful in bloom and I resolved to attempt this method of training in my own garden. The results have been a great joy.

The system of training, which I will describe, has been evolved with Wisteria floribunda specifically in mind and it and its cultivars are the plants I would recommend for the purpose. Unlike

the more common Wisteria sinensis. Wisteria floribunda has inflorescences anywhere from 12 in.-36 in, long as well as a delicious fragrance. A wellflowered vine resembles a cascade and you can choose either single or double flowered forms in the color range mentioned above. Wayside Gardens in Hodges, South Carolina, is the only firm I have been able to find listing Wisteria floribunda cultivars retail. Your local garden center can obtain them for you from two wholesale sources, Princeton Nurseries and Gulf Stream Nurseries. (If you wish to study Wisteria floribunda cultivars before making a selection see the collection at the Arthur Hoyt Scott Horticultural Foundation at Swarthmore College.)

the structure

The success of this method of training depends on creating a strong structure of trunk and horizontal branches with lower branches the longest, and branch length diminishing the closer they are to the top of the tree. The practical reason for this system of pruning is that it allows maximum light to reach all branches thus insuring



maximum flower bud production. Branches are trained to occur in whorls (three to five to a whorl). Vertical distance between branch whorls as well as the distance of the first branch whorl from the ground should be a minimum of 36 in. so that the blossoms on each branch hang free and are uncrowded.

My own trees are mostly 10 ft.-12 ft. in height and vary from 9 ft.-12 ft. in greatest spread. A few have two whorls of branches; most have three.

Wisterias never develop stems strong enough to remain completely unsupported. Therefore, I feel it is essential to face this fact in the beginning and put in a strong permanent vertical support before the vine is even planted. I have used 1%-in, galvanized pipe with 2-ft. sections welded at right angles near the base and placed 4 ft, in the ground embedded in concrete (see illustration). This insures that your tree will not tilt in heavy windstorms and means you can securely lean a ladder against the support when pruning. The above-ground portion of my support graduates down in diameter from 1%-in. pipe to 1½ in, at the first whorl of branches and to 11/4 in. at the second whorl of branches. The top is capped with a standard pipe cap. They have been left unpainted, have weathered gray and are unobstrusive in appearance.

The plant requires full sun on all sides; sites should be selected accordingly. Wisterias are not fussy about soil. Too rich a soil is actually a disadvantage, encouraging such an abundance of growth that the pruning chore is increased and flower bud initiation may be depressed. In extreme winters, like the last two, harsh winds combined with low temperatures can injure flower buds. For this reason a site protected from the northwest wind but with good air and soil drainage is desirable. Aesthetically, the plants may be used in a formal setting or grouped, as mine are, as an informal grove on a hillside. Since each plant is "custom made" their size and proportions can be created to fit the spot.

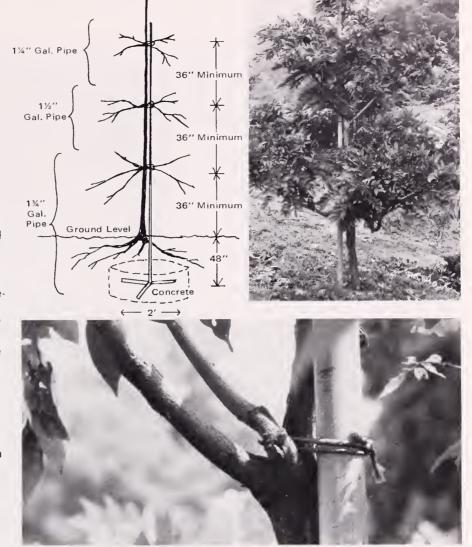
Once the vine is planted at the base of the pipe support, the next few years (probably four to five) should be characterized by patience, occasional pruning and "tying in." The timing of the

pruning should simply be on an "as needed" basis. Two or three shoots should be tied up against the pipe as candidates for the "trunk" and all other shoots should be kept cut off. After the first winter select the strongest shoot for the trunk and cut the others off. This shoot should be allowed to grow until it reaches the point where the first whorl of branches is desired. It should be nipped here to encourage the development of side branches. Once adequate branching has occurred, again train several shoots upward, eventually selecting one for the continuation of the "trunk," Repeat the process where the next whorl of branches is desired, etc. The number of branches in each whorl should be no more than five (to avoid overcrowding the blossoms) and fewest in the upper whorls where branches are shorter. The branches should be kept short at this stage, both to allow the trunk time to increase diameter and to allow strong branch unions to develop. The longer branches can be grown later. I am always concerned about snow and ice damage to mature tree wisterias and, therefore, feel that it is best to limit branch length to a maximum of 5 ft. for fear too much weight on the branches in the wintertime will tear them from the trunk. As pointed out earlier, upper branches are, of course, shorter than lower ones.

I use "tarred twine" (available from our local paper and twine store) for tying the branch to the pipe support. This material lasts for better than 12 months, so I feel satisfied that my plants are securely fastened between annual prunings. I try to keep the trunk from wrapping around the pipe both because I feel it will look more tree-like if it does not and because it would be more difficult to replace the support if that were ever necessary. I use a clove hitch around the pipe support to keep the tie from slipping vertically (before going twice around the wisteria plant).

pruning

After the structure of the plant has developed, the first objective of pruning becomes bloom development, then remedial structural repair. For this reason, timing of pruning becomes critical.



The relationship of pipe support and trunk



The beginning of a replacement branch



After pruning



Pruning to two buds. Before at top and after below.





A single branch before pruning.



The author does the job.

Blossom buds form on current year's wood. If current growth, which can be 6 ft.-12 ft. long, is all cut off there will be no flowers the following year. If the growth is not cut off a great tangle results and the topiary loses its character. The trick is to allow the new growth to complete its major spring spurt before pruning, which I usually do by July 4th. Then cut it all back except for a few buds immediately next to the old wood. My pruning, therefore, usually takes place in early July, and I leave the first two buds (next to the old wood) on each shoot, unless these seem weak and the third or fourth buds seem stronger. It is a matter of judgment.

After I have done my bloom pruning I then stand back and study the tree from the point of view of aesthetics of shape, need for thinning and branch replacement. Occasionally, a

branch will get too long or too heavy and I will shorten it or thin it out to prevent snow and ice damage. Where a branch has been lost a new shoot can be trained over to take its place. It is at this time of year that I also replace all tarred twine holding the main trunk to the pipe support. I also check the ground around the base of the trunk for any shoots that may be surfacing from the root and remove these.

In some years, especially wet ones, additional shoots will be put out after the July pruning. I check the trees over in late September and remove the new shoots, which isn't usually a major chore.

Once the plant is established, the annual pruning takes no more than a couple of hours per tree. I use no fertilizer and have had no insect or disease problems. For anyone who enjoys the art and craft of gardening the process

is thoroughly satisfying: the pleasure of designing and creating living sculpture, as well as a good chance for lots of blooms every year. For such a small annual effort the rewards are great.

The great cascades of blossoms come around May 15th in Wilmington, Delaware, after the passion of azalea season is past or waning. The peaceful, ethereal quality of the wisteria display is welcome, and the weather has moderated sufficiently so that outdoor living has just begun. We often give a party in honor of our tree wisterias; it's such a special moment.

William H. Frederick, Jr., practices landscape architecture in Hockessin, Delaware, specializing in residential garden design. He is the author of 100 Great Garden Plants (Alfred A. Knopf, 1975) and teaches a seminar on Planting Design at the University of Delaware.



Magnolia 'Ann,' National Arboretum Magnolia.

Magnolias for Gardens in the Delaware Valley

by Judith D. Zuk

Magnolias are satisfying year-round. In the spring I find myself wandering into strangers' gardens to admire their trees as soon as the display begins with the delicate white flowered anise magnolia (Magnolia salicifolia) in early April. By May I'm attracted to our native American species when they start producing their creamy flowers after their leaves emerge. Once I've taken softwood cuttings, summer brings me a little rest, with only an occasional sporadic blossom to be seen on some varieties among their neat foliage. In the fall I anxiously wait for the large oblong fruits to split open to reveal their brilliant red seeds, signaling to me it is time to collect and tuck the seeds away in the refrigerator for sowing in several months. At last winter comes, and a walk in the snow reveals beautiful twisting branch patterns and fuzzy, silvery buds against a blue sky.

I confess that my interest in magnolias exceeds that of most people, and I could probably rationalize someone's filling every spare inch in their garden with these beauties. To be more reasonable though, I might suggest planting just five kinds, which would still allow you to have flowers from April through July. If I had to, however, I'd settle for planting one magnolia, and I'd enjoy its other qualities when it is out of flower.

Taking a closer look at an individual blossom you can see characteristics of primitive flower forms, for they have changed very little over time. The petals and sepals are not differentiated, so they are referred to as tepals. Most flowers begin upright and globular, only to spread open their tepals to reveal beautiful gradations of colors and contrasting stamen. The flowers are often pleasantly fragrant.

Our ornamental magnolias come from two geographical areas. Those native to temperate North America have white, cream or yellow flowers appearing with the leaves. Their Asian relatives are much more conspicuous in flower, displaying their richly colored pink to maroon blossoms on naked branches in early spring. Familiar examples of the latter are the commonly planted saucer magnolia (M. x

continued

Magnolias for Gardens continued

soulangiana) and the star magnolia (M. stellata). Both of these are certainly good garden plants, but by no means the only choice in flowering magnolias. With a little searching in nurseries the less common varieties mentioned below can be found. All are hardy in the Delaware Valley and offer alternatives in color and habit to the two old standbys.

The star magnolia is unquestionably a good plant for small areas and any spot where a dense, floriferous plant is desired. At the Scott Horticultural Foundation we have a beautiful multistemmed specimen that is only 10 ft. tall with a spread of about 15 ft., after nearly 50 years. It is an outstanding sight when it is covered with starry. fragrant white flowers in early April. Unfortunately, because it flowers early it is often touched by frost, which in a bad year can turn the blossoms to brown mush. Avoid this disaster by selecting a star magnolia hybrid that has many of its parents' qualities, but a later flowering date.

hybrids

The National Arboretum has bred several compact hybrids that bloom profusely two to three weeks after the star magnolia. This delay can help avoid unpredictable frosts in some years. These eight hybrids, all bearing women's names, are a result of crosses between the pink star magnolia (M. stellata 'Rosea') and the late flowering, dark colored lily magnolia (M. quinquepeta 'Nigra'). Among this group, 'Ann' and 'Susan' are particularly good.

'Ann,' the smaller and earlier of the two, begins flowering in mid-April, providing an eye-catching show of fragrant reddish-purple flowers that last for 10 or more days. It is an ideal size for many small places; a 20-year-old specimen at the National Arboretum is a nicely rounded, multi-stemmed plant, only eight ft. tall.

Its relative 'Susan' is a more vigorous grower and tree-like in habit, yet is only 10 to 12 ft. tall. Neither is likely to block your windows or consume your entire yard. In late April 'Susan' produces striking dark maroon flowers from tapered buds, which fade to a lighter pink. As with 'Ann,' the delayed flowering, small size and unusually bril-

liant color makes this a valuable addition to the list of plants available for bloom in April.

On the other hand, if you are willing to take a gamble on blossoms being destroyed by frost, the 'Merrill' magnolia (M. x loebneri 'Merrill') will reward you with its beauty. It too has the star magnolia as one parent, but its other parent is the kobus magnolia (M. kobus), a much larger tree. From both parents it gets its early flowering, and in the beginning of April even small trees of this variety will be covered with white, semi-double flowers. It is a fast grower and more upright and pyramidal than other magnolias, making it a good choice when you need a plant with a limited spread. Although it can grow to 30 ft. Dick Lighty in Kennett Square prunes his to only 15 ft. to keep it in scale with his landscape. It is particularly striking when it is backedup by evergreens, to show off its flowers and form.

most common

Perhaps the most common magnolia in cultivation in our area is the saucer magnolia (M. x soulangiana). You have only to walk around Swarthmore in mid-April to fall in love with this plant. It performs well under adverse conditions-in fact, I have seen these trees thriving in the rugged urban environment of Newark, NJ. Even the novice can expect success with this plant, a fact which, in addition to its beauty, explains its popularity with homeowners. Although I love them, I don't recommend too much of any good thing, so at a minimum I suggest planting a selected cultivar that differs from the standard type. 'Brozzoni' is a particularly good white form, and 'Verbanica' has large, clear pink blossoms. Both flower a little later than the straight type, which extends the blooming season a bit.

The saucer magnolia is a hybrid between the shrubby lily magnolia (M. quinquipeta 'Nigra') and the tall Yulan magnolia (M. heptapeta). Of these two, the Yulan is an excellent tree for our area and should be grown more, for it has many qualities that can make it more desirable than the saucer magnolia.

Native to China, the Yulan magnolia

(formerly called M. denudata) has been grown for centuries in temple gardens in the Orient. Its fragrant ivory flowers are chalice-shaped and a beautiful contrast to the attractive gray bark. This is one of the tallest magnolias and can grow to be a 30-ft. specimen tree. Whereas the saucer magnolia tends to spread as much horizontally as vertically, the Yulan magnolia can be singlestemmed and if the lower branches are removed, it can serve as both a shade and flowering tree. It blooms just before the saucer magnolias are at their peak, and the outstanding beauty of its firm flowers makes growing it worth the risk of frost damage in an unkind

As a rule, all magnolias need similar care. It is best to buy a container-grown plant or one balled in burlap, because the fleshy roots do not react well to being disturbed and should be treated with care. Planting in spring may be more successful than in fall. Plant it in a sunny, well-drained area in slightly acid soil into which you've incorporated organic matter. These plants tend to be surface rooted, so mulching under the tree is a good idea. This will also help avoid "lawnmower blight," since magnolia bark damages easily.

It seems to me that people often do not control magnolias with careful pruning to show off their best qualities. As with all trees you should remove basal suckers and conflicting water sprouts on the branches to maintain the habit of the tree, and even if a multi-stemmed plant is wanted, all of the stems shouldn't be allowed to grow. One of the most beautiful features of our old star magnolia at the Scott Foundation is that it has been limited to 13 main stems, which carry the crown of dense flowers and foliage. Since magnolias should not be heavily pruned it is best to begin shaping them at an early age, and you will be rewarded for your efforts.

Happily, this group of plants is not plagued by insects, and the sturdy foliage looks good throughout the growing season. In our area a giant soft scale will attack young twigs (especially the saucer magnolia), but we have only found isolated cases at Swarthmore. They are so big that they are easily



Magnolia stellata

seen, and a spray of dormant oil in early spring on infected plants keep it under control.

propagating

Over the past few years I've propagated some of my favorite magnolias and have encouraged others to try it when they've seen a plant they like. The deciduous, spring flowering varieties can be propagated with varying success by softwood cuttings in early summer, just after the terminal buds are set. I treat my cuttings with rooting hormone, put them under mist, and wait. I have found that 'Ann,' 'Susan' and their group root very quickly while the saucer magnolia varieties are slower, but still successful. Unfortunately the Yulan magnolia has been reluctant to root for me in great numbers.

Seed propagation is also possible with some varieties, although 'Merrill' and other cultivars should be propagated by cutting if you want to preserve the particular qualities of that plant. If you are inquisitive and patient you might try growing seed from hybrids to see what variations might be produced. In all cases, harvest the seed as it ripens, for it loses viability quickly. It should be mixed with moist sphagnum moss, labeled as to its source, and stored in closed plastic bags in the vege-

table bin of the refrigerator for three months. After that time it should be cleaned and planted.

My last suggestion is to be creative in your use of these plants. If you have the room, I suggest planting a grove of magnolias. It is really quite a sight in flower. If you have an individual specimen, it can be highlighted while in flower with spotlights shining up through the blossoms at night. Another overlooked use of many trees is to train them as wall plants, a technique well adapted in England. The beautiful stone and brick walls in Delaware Valley lend themselves to this very nicely, and the color of many saucer magnolias blends well with red brick, a building color that I find does not always go well with other flowering trees. I have seen a saucer magnolia artfully espaliered on the side of an old stone house in Wawa, and it is lovely all year long. 'Merrill' would be particularly good to train in this fashion as it grows quickly, with fairly long branches. Putting it on a cool north-facing wall would cause it to flower later, when there might be less of a chance of frost spoiling the blossoms.

Whatever magnolia you choose, underplant it with early spring bulbs to enhance its beauty. Grape hyacinths, squills, chionodoxa, snowflakes and varieties of narcissus all have compat-

ible blooming times and colors that harmonize with the magnolia blossoms. For living proof of this, come out to the Scott Foundation in Swarthmore this spring, and enjoy the wide range of magnolias we grow with their complementing bulbs. It might convince you to select your next magnolia for form and flower to fill your particular needs in your garden.

Source for unusual magnolias

Gossler Farms Nursery 1200 Weaver Rd. Springfield, OR 97477 503-746-3922

Suggested references on magnolias:*

- *Johnstone, G. H. *Asiatic Magnolias in Cultivation.* Chiswick Press, London, 1955.
- *Millais, J. G. Magnolias. Longmans, Green and Co. Ltd., London, 1927 (reissued 1972).
- *Treseder, Neil G. *Magnolias*. Faber & Faber, London, 1978.
- *available in PHS Library

Judith Zuk is educational coordinator of the Scott Horticultural Foundation in Swarthmore. She will be looking for magnolias on a spring garden tour of England that she and Jane Pepper are leading. Zuk is a member of the International Plant Propagators Society.

- 1 Narrow driveway at NE border of property showing adjacent neighbor's viny succession and the outer edge of phragmites' patch.
- 2 Neighboring barn with existing woods and open space in background.
- 3 Ash-maple association.







The Legal Problems of Cultivating Your

Eight years ago my wife and I returned to Philadelphia where we were both enrolled at the University of Pennsylvania. I was in the School of Regional Planning and Landscape Architecture; Wilma was finishing her certification in Occupational Therapy.

We had begun house hunting in the area, and one day after five hours of dragging from one split level colonial development after another, the real estate agent said somewhat desperately that she knew of a small ranch on an acre plus of land in Gulph Mills.

We turned off from Upper Gulph Road onto a narrow drive and found ourselves on an internal piece of property situated with six other houses, each on an acre. They seemed to be part of an old estate, stucco white house, barn, pond, the works.

The house looked like a long trailer but Wilma and I saw that the attached garage could be converted into a large living room and that there were the

right number of rooms in the proper sequence.

Leaving the house, I stepped out

The property was so wet in the back, that the gardener I hired to get the waist high grass down to ankle length watched his large machine sink. He ended up cutting a combination of mud and grasses.

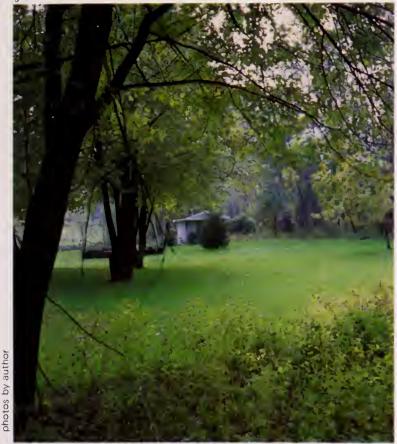
onto the back patio to find an enormous open expanse of lawn strategically spotted with swamp maples and American ash. The edges of the property flowed into a neighbor's manicured lawn on one side and a swampy area and a large stone barn on another side. The third side was the shared drive edged by a viny successional tangle and the fourth side was a hedgerow in pine and dogwood. The swampy area

housed skunk cabbage, spice bush, a red osier dogwood-type plant, sycamore, maple, alder, ash, etc. On the far side of the swamp off the property but within view was a farm pond surrounded with lush vegetation. Beyond the pond a stream. That was it. Although it wasn't all contained within our acre the backdrop for the property was all there—a rural setting 20 minutes from center city Philadelphia.

We made a bid; it was accepted and then we checked the details. The detail: an option to hook to a sewer, and really how wet is a wet property? When we moved into the house in July 1972 we discovered the answer to both questions. The property was so wet in the back, that the gardener I hired to get the waist-high grass down to ankle length watched his large machine sink. He ended up cutting a combination of mud and grasses.

Also the first year we lived in the house was an extremely wet one. We

SE property boundary showing neighboring manicured lawn sandwiched between early succession in foreground with existing forest succession in backaround





NW property boundary showing pine-dogwood hedgerow.

Own Garden: trend or trouble & by Saul S. Wiener



watched the water in the basement rise and ebb with the rains. The stream even jumped its channel and flowed through a swale on our property during one of the major storms. As for the sewer, none of the neighbors wanted to grant us an easement. The totally saturated ground left me with the option of having the sewage back up into the house or having it trickle out of the cesspool over the grounds.

In order to keep the children from falling into the small pit I dug to loosen the cesspool cap, I ringed the hole with arborvitae. Down stream from the trickle I planted a couple of phragmites that I had found on an abandoned acre at the entrance to the expressway. I figured they would spread quickly and provide vegetation for uptake of the cesspool nutrients and also discourage people from walking in the sewage area.

Then bravely I put on my galoshes, directed my lawn mower and hoped it would not sink as I attempted to main-

tain my estate. It didn't work. An acre of wet grass in full sun grows at an astonishing rate.

planning

I decided to try another approach. Being in the school of Landscape Architecture and Regional Planning I was learning how to identify, understand and use native vegetation in the landscape. I began to raid Sears at St. Davids at the end of November to buy out anything they were ready to discard. Then I would with my great design flair place these few plants on my acre without much regard for their ability to stand in water or wet soil. My wife, having a more sophisticated understanding of the plants and their needs, directed some of them to their proper location. We lost some and some survived. But that was not solving the problem-namely how to handle close to an acre of swampy land without waiting for those rare dry moments so

we could rush out and mow like mad.

We were now in our third season; my lawn mower had been stolen once; the sewer was in; and we noticed lovely lobelia, sweet fern and rush in various poorly mowed sections of what we now called "our swamp." We decided to let it go. I found a mowing line at a contour where the mower would stay out of the mud and where the kids would have enough room to play frisbee. Again I tripped off to Sears to see how to fill this area, to give it some height and dimension to screen our patio from our most visible neighbor. Sears' offerings were miniscule. But by now my education had given me enough insight to understand that if I looked carefully at the grounds, mine and the adjacent succession, the grounds themselves would provide the solution.

relocating

This approach led to plant relocation. Anything that I observed growing in continued

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Then bravely I put on my galoshes. directed my lawn mower and hoped it would not sink as I

Vegetable garden looking at lawn with successional swale in background.

attempted to maintain my estate.

the neighborhood in similar circumstances I tried on our property. Some from neighboring woods and wet fields, others from vacant lots, stream banks, ponds, swales and intermittent puddles. I kept my trowel in the trunk of the car along with several plastic bags. What arrived in the next year was: alder, sweetgum, weeping willow, corkscrew willow, cattails, more phragmites (at this point well established), spice bush, pussy willow (salix) and many Sears non-starters such as pyracanthas, pine, crape myrtle and other routine sales items. I composed all these items as small as they were only to see them overscaled in a rather expansive wet meadow lawn. My wife and I talked incessantly about how to manage "our swamp." What should stay, what not, what moved, how high things should be, etc. The winter came and we were saved until the next season.

The fourth year brought a change in attitude. Rather than plant like mad to fill space we watched certain areas to see how they composed themselves. The wet areas seemed thicker and lusher than the year before. Jewel weed flowed and undulated over the complete area; saplings began to poke

through the herbaceous layer and the previous years' trees grew like Jack's bean stalk. My major disappointment that season was that this garden was to have its own form and guiding force rather than be managed by gardeners. So, I found another outlet for my midline exercise, and we penetrated our meadow to investigate its structure and progress.

wildlife

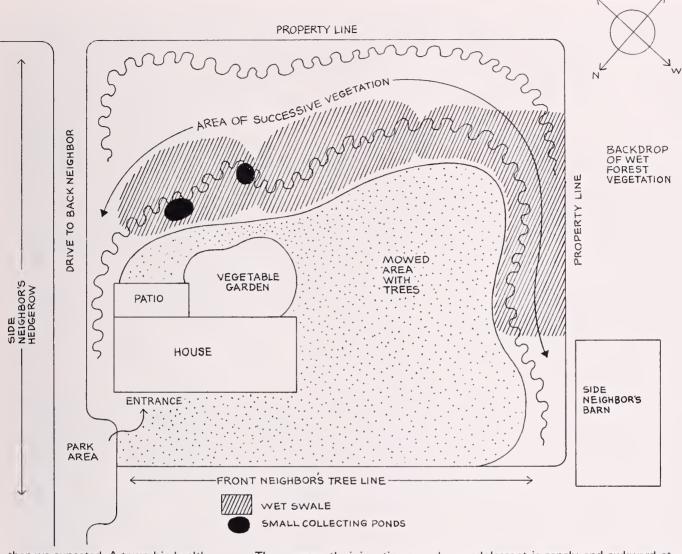
The fifth and sixth seasons were lusher than ever. The herbaceous material was rich, thick and impenetrable a veritable riot of vegetation. The saplings were pushing six feet. Actually things looked as though they were gearing up for the battle. Also the wildlife noticeably increased. We could easily distinguish many species of birds. Pheasants began to wander over from our neighbors, and one afternoon we found a garden snake curled up in the large leaf of a cultivated zinnia. Toads, frogs and turtles appeared as well as

raccoons, opossums and a chipmunk or two. They did not seem frightened by the house as the vegetation provided more significant cover.

The seventh season was ushered in with great enthusiasm. We were learning to sit back, relax and enjoy it. I struggled a little pulling some poison ivy, and I introduced more cattails into a wetter area without the interference of phragmites since the two did not seem to cohabit well. We also created a few small collecting pools in spots to see if we would hold water for longer periods of time to entice different plants. I mowed a little less to let the edge creep into the larger play sections, and we wondered what we would do with all the saplings if they actually matured. The expectation of a floodplain woods now became an accepted goal.

the law enters

That season towards August the succession seemed to attract more wildlife



than we expected. A township health inspector paid us a visit. He said that a neighbor had complained and that to comply with the "weed ordinance" we might have to cut. I responded that we had a lifestyle difference, and we had been through this same routine with this neighbor over other issues. The inspector said that it might be in order to cut the driveway edge and the back edge of the property because the neighbor had also complained about allergies. Actually there was ragweed all over my neighbor's driveway edge-I had pulled all mine. To comply we pulled a fair amount of jewel weed in the specified locations.

We were then served with a notice saying the same thing. Several days later the inspector called and insisted that was not the solution. He said we could be fined, our weeds would be cut and we better level it or else. We hired a lawyer. A hearing date of October 19 was scheduled to review the merits of the case.

The press saw the injunction on public file and swooped down. Three television stations, two major local papers and one UPI later we decided to close the house and go to the shore to relax for a few days. When we returned we had to think about the realities and expense of a court case. None of it was pleasant.

In thinking about the case the feeling of being on the defensive led one of our neighbors to help by suggesting some hard negotiation. With nothing to lose we contacted one of our township supervisors who negotiated on our behalf to the point where the township felt they would not be able to win the case on the basis of constitutionality and said they would try to create a weed ordinance with an exception clause for successive vegetation. VICTORY! I hope to have some input into the ordinance—as throughout the country there seems to be no model for this type of regulation.

Successive vegetation as a developing

adolescent is gangly and awkward at certain stages when vines try to choke saplings and poison ivy, lonicera or Mexican bamboo run rampant.

But they are only temporary stages and with management techniques can be controlled so problems of vegetation intruding on neighboring properties are eliminated, and the final stage, i.e. mature forest, can be reached.

Succession on a wet property seems to me imperative. For stream bank erosion, stabilization, aquifer recharge and runoff erosion alone wet properties or portions of them should be managed in this low energy manner. The results as well as the process can be stunning.

Skip Wiener's problems with his property gave him the opportunity to work out his philosophy about successive vegetation. The philosophy was developed while getting his degree in landscape architecture at the University of Pennsylvania. He is a planning coordinator for the Bureau of Coastal Planning and Development for the New Jersey Department of Environmental Protection.



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A Book*that Almost Wrote Itself

This book*constitutes a unique record of hybridizing rhododendrons in the eastern United States. Its like is not to be found for this or any other genus, at any other time, in any other place, in the history of horticulture. In the scope of its concept and the comprehensiveness of its execution, it stands alone.

David G. Leach

by Franklin H. West

It is hard to realize that just 100 years ago the people of the Delaware Valley could not have seen the blazing spectacles of azaleas and rhododendrons that we regard today as commonplace. How did such a miraculous transformation of eastern gardens actually happen? Partly by good fortune as in the case of the Waterer rhododendrons from England and the Kurume azaleas from Japan. The Waterers had used R. catawbiense from our Southern Appalachians in their hybridizing efforts, which enabled their plants to adapt to our climate. The Kurume azaleas were bred in a climate so similar to ours that they also could adapt to eastern gardens wherever the winter temperature did not dip below minus 5°F. The Belgian Indian azaleas proved supremely at home in our southern states. These plants formed the nucleus of the miracle in eastern gardens.

The larger part of this miracle was produced by the hybridizers who created new varieties of azaleas and rhododendrons right here in our own climate: e.g., Charles Owen Dexter, Joseph Benson Gable, Benjamin Yeo Morrison, G. Guy Nearing, Anthony M. Shammarello. These five plantsmen are the pioneer rhododendron and azalea hybridizers in the eastern United States. They deserve the bigger share of our appreciation for the beauty of our springtime azalea and rhododendron

displays.

Many of us in the American Rhododendron Society have wanted to express our appreciation of the pioneer hybridizers and their plants in some permanent way. Since none of them had received recognition in a book devoted to their lives and works, it seemed most appropriate to publish a

American Horticultural Society

Past President

We began work on the project in 1972. Everyone we contacted was delighted with the prospect of contributing to a commemorative tribute to these plantsmen. A book committee was organized with Dr. John Wister, of Swarthmore; Heman Howard, of Heritage Plantation; Gordon Jones, of Planting Fields; Alfred S. Martin, president of ARS; Philip Livingston of Narberth, Pa.; Fred Knapp, of New York; Roy Magruder, of Washington, D.C.; David Leach, of Madison, Ohio; and the writer as chairman.

Appreciation was not the only spur to our efforts—disappointment also played a part. The genetic endowment of rhododendrons is so climate-specific that they lack the general adaptability of other garden flowers, such as the rose and marigold. (There probably will never be an all-American rhododendron.) Most hybrids bred in other parts of the world, or even in our own Pacific Northwest, do not prosper in our sterner climate. The American

continued

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^{*}Hybrids and Hybridizers: Rhododendrons and Azaleas for Eastern North America. Edited by Philip A. Livingston and Franklin H. West, Harrowood Books, Newtown Square, Pa., 1978. (215-353-5585)

A Book that Almost Wrote Itself continued

Rhododendron Society published quality ratings for many hybrids, but had failed to signify where the more highly rated plants would perform well. As a result, eastern gardeners repeatedly purchased highly rated plants from nurseries in the northwest only to suffer repetitive disappointments in their dismal performance here. (Fortunately, ARS, in 1976, completely revised its awards and ratings of plants, and now gives them regionally.) In an effort to prevent further disappointments, our book committee decided to survey all eastern ARS members to find out which azaleas and rhododendrons actually do best in our varied eastern climate from the Midwest-Great Lakes region, New England-upper New York to the Mid-Atlantic, and Southeastern states. The late Francis Sholomskas, a professor of mathematics at Temple University and past president of the Philadelphia Chapter of ARS, supervised the survey and tabulated the results. (See table at the end of this article.)

the biographies

John Wister and Heman Howard collaborated on the Dexter chapter. Both had been involved in selecting, naming, and bringing the best Dexters back to their place of origin on Cape Cod. Heman also introduced us to Dexter's grandson, Dexter Schierenbeck, and his father, Ludwig, who shared many reminiscences of Dexter.

Alfred Martin, who had been an ardent admirer of Tony Shammarello's plants for years, agreed to do his biography and a description of his hybrids.

A fortunate visit to Washington by the Canadian, Dick Steele, sparked the formation of a Gable Study Group in the Potomac Chapter of ARS. Steele had given a talk in 1973 on Gable's work at Stewartstown, Pa., and quoted at length from his journals and correspondence. The chairman of the Study Group, George Ring, offered to share his group's findings with us, and, in addition, agreed to write a chapter

about the contemporary eastern rhododendron hybridizers who are carrying on in the tradition of the pioneering five.

An elevator ride proved helpful in our efforts to find a biographer for Guy Nearing. At the Pittsburgh convention of the ARS in 1973, our chief editor, Phil Livingston, overheard Paul Sleezer talking about Nearing. This contact resulted in a promise to write the Nearing story. Sleezer, a member of the

Most hybrids bred in other parts of the world, or even in our own Pacific Northwest, do not prosper in our sterner climate... eastern gardeners repeatedly purchased highly rated plants from nurseries in the northwest only to suffer repetitive disappointments in their dismal performance here.

Nearing Study Group, also helped us obtain copies of Nearing's extensive correspondence with Joseph Gable, selected portions of which were included in the Nearing chapter.

Ben Morrison proved to be a bit more elusive. There were many who had known him-John Wister, George H. M. Lawrence, Roy Magruder, Holly Hollowell, and George Harding among many others. Fortunately, Morrison's papers were preserved at the Hunt Library for Botanical Documentation at Carnegie Mellon University in Pittsburgh where Lawrence had served as its first director. When Lawrence declined to undertake a collaborative authorship, we succeeded in getting Harding's and Hollowell's reminiscences, along with the complete file of Morrisons's papers in the Hunt Library's file, thanks to its archivist, Abby Levine, From this we were able to assemble an image of the man who had been editor of the AHS Journal for 37 years, the first director of the National Arboretum, and the creator of 454 Glenn Dale azaleas.

Joseph B. Gable's story in our book deserves special acknowledgement

because of its exceptional merit. One of his daughters, a journalist, felt it unseemly for a family member to write of her father's life and career. After some gentle persuasion, she gave us a moving story of his life for the Gable chapter, with the stipulation that we not reveal her authorship. We can't keep the secret any longer.

Gable and Nearing collaborated in their hybridizing efforts to an unusual degree-ultimately to the benefit of both, but an exchange in which Gable proved to be the benefactor. We had Nearing's letters to Gable for the book, but where was the reciprocal correspondence? In an attic, as it turned out. After the book was in final proof, the letters were remembered by their forgetful borrower and were rushed to us in time to include a generous sampling of them as a supplement to the book. This allowed us to publish a unique exchange of letters between these two hybridizers who addressed each other as "Mr." for over ten years before they agreed to first-name each other.

By 1977 the book had grown beyond the limits of the originally planned 128 pages, even before we began the process of selecting 108 color slides to use for illustrations. To help launch us into print in fitting style, David G. Leach, past president of the American Horticultural Society, sent us a masterful introduction to the book (see excerpts). Then, with professional help from our editor, Phil Livingston, his editorial assistants, the indexers, and Paul Harris's staff of Harrowood Books, in Newtown Square, the book was assembled from a thousand pieces. With financial assistance from Heritage Plantation and a Ioan from the Fidelity Bank, we took our book to the printer in April, 1978 under the title Hybrids and Hybridizers, Rhododendrons and Azaleas for Eastern North America. One of our friendliest reviewers said it was the first rhododendron book with a plot!

Looking back at all the generous help we received in putting the book together, it still seems like a book that wrote itself—almost!

Excerpts

from David Leach's Preface of

Hybrids and Hybridizers: Rhododendrons and Azaleas for Eastern North America

Joseph Benson Gable

Breeders in the cold Northeast usually regard Joseph Benson Gable as the dean of American hybridizers. His output was astonishing but his experience with, and knowledge of rhododendrons were overwhelming. Years ago I had his original notebooks copied. They occupy three volumes in my library. They contain wryly humorous comments, many deleted in later versions, about the incredible number of different species and hybrids he grew. Describing the unattractive progeny of a cross which particularly disappointed him, he called the seedlings "a rather disreputable lot." That was the harshest judgment, of plants or people, of which Joe Gable was capable. He loved them both.

Guy Nearing

When I first visited the nursery which Nearing was laboring to establish, I was astounded to find him presiding over an unpromising patch of land strewn with rocks of all sizes. As we picked our way along the paths, I inquired how the deep storage pits had been excavated through the huge buried boulders. The seemingly frail, gray haired man diffidently replied that he had done it himself, using a principle of Archimedes.

One of the most phenomenal Nearing traits is his capacity to endure. Now 87, his life has been ravaged by disasters: blindness, an inconstant patron, ill health, privation, devastating flood and finally, after the chapter in this book was written, the one afflic-

tion he had seemed to escape: fire, which utterly destroyed his home. . . .

[His] letters are often buoyantly optimistic and totally committed, as when he writes that, despite the lack of future financial return, "the work seemed so tremendously worthwhile that we had to go ahead with it." Or, "Rhododendron breeding is a sort of religion with us." After his appalling afflictions, including the destruction of his nursery, only 20 months after a second start with the help of his close friend, Gable, he was writing, "I really feel encouraged."

"I intend to go right on crossing as though I had 200 years to live."

Then there are the dark moods. At 66, Nearing wrote, "I'm beginning to feel my age. It looks as if my hybridizing has nearly come to an end." He was still doing strenuous folk dancing at 87. Then, "After nearly 15 years of breeding, I have fewer than a dozen plants kept for observation, and most of those will pretty surely be thrown away." Or, later, "And now, after . . . years of work, I still haven't raised a first class seedling." After the flood came despair: "I have sold off . . . my nursery, and closed the place for keeps . . . there is small likelihood that I can ever take up . . . hybridizing . . . again," But the resolute spirit always regains ascendancy: "It is likely that none of the crosses I make now will ever do me any good. However, as you may guess, I intend to go right on crossing as

though I had 200 years to live. I want to go ahead with all that give promise." Or, "By the time next year's seed is turned into flowering plants, we'll be old men . . . however, if I were not interested in this work for its own sake, I wouldn't be in it at all."

Tony Shammarello

Tony had grown up in Little Italy, one of Cleveland's toughest neighborhoods. Many of his friends were young hoodlums; some of them ended up in prison. Few escaped the trap of the inner city, but Tony and his family were different.

Young Shammarello had always been impressed by his father's work at the cemetery, famed then, as now, for its floral displays. He thought it was a great feat to put small magnolias and flowering cherries into the ground, and have them produce in a few years the springtime showers of flowers staged by the older trees. When he was 17, Tony met Michael Horvath, the owner of Mentor Nurseries, who knew the Latin names of plants and was willing to take the time to explain their meaning to an eager teenager. Tony was so impressed that he offered to work without pay in Horvath's greenhouse, for the knowledge and experience to be gained from the distinguished older Hungarian. Came Christmas, and Mr. Horvath presented his helper with a cash gift. It was immediately refused. The obligation lay in the other direction. Tony's father directed him to take a gallon of wine as a holiday gift to Mr. Horvath.

continued

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Exchange of Correspondence

March 17, 1942

From Guy Nearing to Joseph B. on Botanical Names

I don't use the author's name because I think that is the origin of a situation which is ruining the whole of botanical taxonomy. The botanical politicians decreed that usage so that they could make themselves famous, and incidentally clean up some money. They name thousands of useless and meaningless species simply to get their own names spread around, and to compel people to buy their new books in order to find out what changes they have made. In my introduction, I proudly state that I have not named one new species, and throughout the book I point out which are real species and which are segregated on insufficient grounds.

I could of course have included the authors, but was specially anxious to avoid the format of the conventional monograph. My book is written to explain what lichens the professional botanists have referred to in their highly technical treatises, for they have scrupulously avoided letting anyone in on this little secret. When the book is finished, they will flail it with scientific curses and common sarcasms, and the more credulous botanists will believe them, but about that time I'm planning to have some unexpected ammunition ready for them.

The best procedure in naming an unknown of your own is to work it out in the manual, then press a bit, and at your convenience take it to a herbarium for comparison. I should think you could reach the Smithsonian without too much traveling, and it is there, I believe, that the material is located, also probably much of Wilson's, Perhaps you have been there.

One thing I'm sorry I didn't do is keep a few seeds of each species. The seeds differ a lot, and would be useful as an aid in determination. Many specimens have flower, capsule and seeds all present, and though seeds are not included in most of the descriptions, they might well be. If a fellow had a good collection of the seeds, he could take those of Feng, etc., and match them up nearly enough to make some sort of guess before sowing.

June 27, 1943

From Joseph B. Gable to Guy Nearing on Hybridizing—A Continuously Progressive Process

At the moment Auriculatum, arborescens, maximum, minus and Camps' Red are in flower. And yes, the diminutive flowered semibarbatum, micranthum and Tschonoskii are all doing their bit. Except the first mentioned all of these are fully hardy and take no particular care except semibarbatum.

The botanical politicians decreed that usage so that they could make themselves famous, and incidentally clean up some money.

In this species one is compelled to take particular care to watch for its blooming time or the flowers will pass all unnoticed. They are just that inconspicuous. However, I regard their coloring and markings as exquisite and am sure were the florets as large as *auriculatum*, rhododendron literature would be crowded with its praises. But aside from being so tiny the little florets are so retracted back beneath the foliage—but I suppose you have it too, my plant coming from you, so you already know all this.

You are quite right that the problem of deciding which plants to introduce is a "perplexing" one. And the perplexity does not always cease even after one has decided. I have already discontinued some of my first azalea introductions. This is bad, very bad. But it is an extremely difficult thing to evade. The trouble seems to be that there is no ultimate in this business. It is an infinite thing.

No matter how outstanding the new variety, improvements will ever be made. The best selling—and best to grow varieties—of all plant varieties are never permanent.

It is a continuously progressive process and I still affirm that when I named an azalea it was an improvement on anything on the market in its day and in its class, But I keep right on breeding. . . . And so it happens that something that looked so good to me ten or fifteen years back that I named it-and some of these have had enough merit to be grown by the thousands to fill the demand-have been so much outdone by newer creations of my own in their same color class, etc., that I would be untrue to my work if I did not discard them and introduce the better variety.

I do not believe in introducing everything that is pretty or just a slight improvement, etc. I think a good bit of my trouble with the azaleas was that so little or no work had been done in breeding hardy sorts that I had the field too much to myself. Almost every new color that came from the Kaempheri-Poukhanense crosses was hardy and hence a new hardy azalea in a new color for a hardy type. Hence I did not hesitate to propagate it. I am still proud of them for I have seen a few gardens with hundreds-one with thousands of Gable azaleas now taller than an average person and I feel that my first ambition in azalea breedingthat of making it possible to duplicate the azaleas of Magnolia Gardens farther north-is perhaps more than an idle dream.

The little 'Rosebud' azalea of which I sent a flower or two is an altogether different type of such promiscuous parentage that it would take a stud book to explain it. It is very dwarf and floriferous and hardy through eight years of record. It roots readily from cuttings. Some of the best old plants of azalea do not root well. It may be introduced in a few years if it will pro-



Wister Garden at Swarthmore

duce wood enough to work up a stock. Have an absolutely blood Red *obtusum* hybrid now. Something that has been non-existent either hardy or tender.

As for *Fortunei* hybrids failing in popularity I do not think they have had a chance so far. I have yet to sell a clonally propagated plant or to name a variety unless 'Caroline' is partly *Fortunei* and this I have not sold, only

named. I could have sold hundreds if I had them—I have just worked my stock up to 24! This old plant Andorra Nurseries offered me \$200.00 for but I asked \$500.00. Humphreys saw it in flower. A hired man said we were both "d—n" fools. Maybe so. Mrs. du Pont declared 'Caroline' is "better than 'White Pearl' even if 'White Pearl' were hardy."... One point concerning plant

introductions. Ninety-nine times out of each hundred it takes the originator to introduce a new variety to the retail consumer. The commercial nurseryman is a hardheaded business man and not inclined to take chances. The variety must get in the gardeners' hands and a demand started before the average nurseryman shows any sign of interest.

Varieties Recommended for the Middle Atlantic Region

The Eastern Book Committee of the American Rhododendron Society sent an eightpage questionnaire to all members east of the Rocky Mountains to determine how successfully the hybrids of the pioneers mentioned in this book were adapting to the locale and to determine quality ratings for their plants.

Following are the ratings received for plants in the Middle Atlantic Region. They are listed in order of preference.

Listed Hybrids (large-leaved rhododendrons)
Scintillation (Dexter), large, pink, May
Windbeam (Nearing), dwarf, pink, April
Cadis (Gable), large, pale pink, late May
County of York (Gable), large, white, May
David Gable (Gable), large, red, early May
Mary Fleming (Nearing), dwarf, apricot,
April

Conewago (Gable), small-leaved, lavender-pink, April

Caroline (Gable), large, pale mauve, May Holden (Shammarello), large, rose red, May

Deciduous Azaleas

Gibraltar, orange, May Cecile, pink, May calendulaceum, orange to yellow, May vaseyi, white to pink, May nudiflorum, pink (Pinxster bloom), May schlippenbachii, white to pink, April Strawberry Ice, tricolored, May

Species (rhododendrons)

carolinianum, small-leaved, pink, early May fortunei, large, pale pink, May yakusimanum, compact, white, May keiskei, dwarf, yellow, April racemosum, dwarf, pink, April maximum, large pink to white, July metternichii, large, pink, April mucronulatum, small-leafed, pink, April catawbiense, large, rose, May

Evergreen Azaleas (all May blooming)
Delaware Valley White (species), white
Louise Gable (Gable), orange-pink
Stewartstonian (Gable), scarlet
Springtime (Gable), early pink
Martha Hitchcock (Morrison), magenta and
white

Herbert (Gable), lavender Rosebud (Gable), double pink Rose Greeley (Gable), white

Ironclads—Hybrids from England (largeleaved rhododendrons) Boule de Neige, large, white, May Nova Zembla, large, red, May Catawbiense Album, large, white, May Roseum Elegans, large, rose, late May Roseum Pink, large, pink, May America, large, red, May English Roseum, large, rose pink, late May Mrs. Charles S. Sargent, large, red, May

Unlisted Hybrids (large-leaved rhododendrons)
Blue Peter, large, blue w/purple blotch, May
Mrs. Furnival, large, pink w/sienna blotch,
May

Gomer Waterer, large, pale mauve, May P.J.M. (Mezitt), small-leafed, magenta, April Vulcan, large, scarlet, May Janet Blair (Leach), large, pink, May Jean Marie de Montagu, large, scarlet, May Wheatley (Dexter seedling), large, pink, May

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by Howard J. Holden

The productive gardener is by nature thrifty. He makes the most of his available space and places plants according to a well thought out plan. The garden calendar is part of that plan and is useful when scheduling sowings, harvests and successive blooms. The productive gardener never throws away a pot, even a plastic one, usually thinks twice before relinquishing a plant to the compost pile and almost always has a container of opened seed packets with some dating back to 1973.

Indeed, many seeds could still be viable if stored for such a time period. After all, 1,000-year-old lotus seed has been germinated and a variety of other seeds have survived one or two centuries. Many common weed seeds germinate after being buried for 30 years, a phenomena that has plagued gardeners since the days of Cain and Abel. Nevertheless, the gardener can benefit from this vitality since many garden seeds will remain viable from two to five years if properly stored. In these days of rising costs the seeds may even be considered a minor investment.

The following chart shows viability; it is compiled from personal experience and respected sources. Some seed can be stored even longer than the chart suggests. Some records show, for example, that celery, tomato, and pepper seed have remained viable for 10 years and aster seed for 13. I suggest the novice do a bit of experimenting before relying on such data.

what determines viability

The length of time a seed will remain viable depends on its genetic makeup as well as environmental conditions both on and off the parent plant. Most

Viability Vegetables (years) Bean 3 3 Beets Broccoli 5 Cabbage 3 Carrots 5 5 Celery Corn Cucurbits 4 Eggplant 5 Endive 5 Lettuce 4 4 Okra 2 Onion Parsley 2 Parsnip 2 Peas 2 Pepper 3 Radish 3 3 Spinach Tomato 4 Viability Flowers

SEED VIABILITY

riowers	(years)
Ageratum	4
Alyssum	4
Antirrhinum	3
Aquilegia	2
Aster	1
Browalia	2 2
Candytuft	2
Celosia	4
Coleus	2
Dahlia	2
Delphinium	1
Dianthus	3
Digitalis	2
Geranium	1
Impatiens	2
Marigold	2
Nasturtium	5
Nicotiana	3
Pansy	1
Petunia	2
Portulaca	3
Salvia	1
Verbena	1
Zinnia	5

seeds contain a food reserve and a protective seed coat that preserve and protect the plant embryo within. On the other hand, the orchid seed has no food reserve and therefore must rely upon a symbiotic relationship with a fungus to germinate. Some seeds, such as willow, die if they don't germinate soon after falling from the parent plant.

Many woody plants produce seeds that often have a dormancy or double dormancy that deliberately retards development to time growth with optimum climatic conditions.

Another variable determining seed longevity is the environmental conditions at the time of seed development. If the parent plant is subjected to unusual stress, such as drought or extreme cold, the developing seed of that plant will most likely be inferior and may not stand the test of time.

The gardener has control over two variables: temperature and humidity of the area in which seed is stored. The oldest and simplest method of prolonging seed viability is to store dry seeds in bags at room temperature. Viability can be greatly increased, however, if seeds are stored at 40°F in an airtight container. This container should be capable of keeping out insects and mice while maintaining the moisture in the seeds. Humidity should not exceed 50% for maximum storage.

Here are a few general rules for preserving seeds:

- · Usually, the larger the seed the longer it will remain viable.
- A very smooth and polished seed coat indicates that the seed can be stored for a long time.
- Seeds of cultivated plants often have thinner seed coats than their wild counterparts, particularly





String beans.

Germination: 12/75 88%; 3/79



Sweet corn.

Germination: 1/77 84%; 3/79

those used for food. Thus longevity is reduced.

- Longevity can differ between varie-
- Some seeds, such as lettuce, produce stunted plants as the seed becomes older.
- The older the seed becomes the thicker it should be sown to compensate for the reduced percentage of germination.
- The usefulness of preserving seed is limited. Sowing seeds that are low in viability is not productive.

a test

The experimental process should

year-old bean seed scored an 86% in a

recent test I ran, indicating the seed should be sown at a near normal rate. On the other hand, three-year-old beet seed scored only 60%, suggesting a heavy sowing would be in order. I have found most seed scoring less than 60% not worth sowing.

Most seeds contain a food reserve and a protective seed coat. The coats preserve and protect the embryo within.

> I hope you won't have to buy as much seed as anticipated this year, unless you are like me. The money saved from using stored seed is applied to the untried and new.



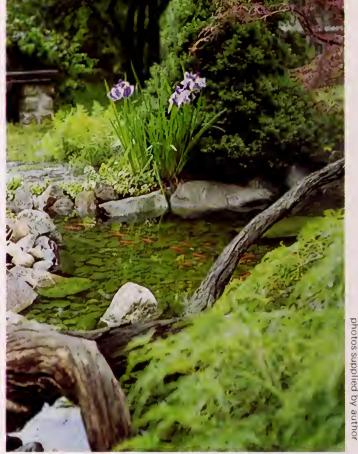
Howard Holden received his degree in ornamental horticulture from Delaware Valley College and is horticulturist/superintendent of "Chanticleer," a private estate.

include an indoor germination test about this time of year. Place a predetermined number of seeds between two moist paper towels, cover with a plastic bag to reduce evaporation and keep at room temperature. When all signs of germination cease, divide the number of seeds germinated by the total number of seeds and the result will be the germination percentage. Since the test is taken under ideal conditions, germination in the garden will be lower than this percentage. The gardener, however, can use this figure to approximate how thickly the seed should be sown. For example, three-

photos by author

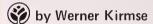
- 1 Foreground, Japanese green leaf cut leaf maple (Acer palmatum). Dwarf Alberta spruce (Picea glauca) with Japanese iris in front of it.
- 2 Blue spruce (*Picea pungens* 'Glauca') on right side. Pachysandra ground cover in background.
- 3 Right, Japanese green leaf (Acer palmatum) cut leaf maple. Left foreground, Japanese iris. Background, red and white blooming azaleas.







Constructing a Mountain Brook with a Rock Garden



Werner Kirmse is an amateur gardener and photographer. He has taken courses in horticulture and landscape design at Temple University, Ambler Campus.

Many of the elements for creating a rock garden and brook were there: two south facing slopes with intermediate terraces and nothing growing but grass; an appreciation of the beauty of weathered rocks and water washed stones; an appreciation of the Japanese theory of rock arrangement; a mechanical and electrical ability to, at least, try anything, and finally a love of gardening.

In my mind, almost all of the work could be accomplished with lots of brawn and ordinary tools. The exception to that was the question of how to construct a brook using not-cheap Philadelphia Suburban Water Co. water, keeping the brook from leaking, and where and how to get big weathered rocks and water washed stones at little or no cost.

Page 141 of America's Garden Book

by Bush-Brown lists the advantages of constructing a garden pool using sheet lead instead of concrete. It seemed to be the method for me: less excavation, no form work, no reinforcing rods, no concrete to wheel, and a naturalistic pool design with an irregular outline. I knew the lead was available at plumbing supply houses in rolls 4 ft. wide, which meant the seams would have to be soldered. I was sure that I could

manage that with a little practice.

rocks and stones

I slowly started to pick up and accumulate water washed stones and attractive weathered rocks. When you become serious about it, though, you quickly realize that you are taking them illegally from either private property or public land. And if you rent a trailer and pull up alongside the Perkiomen and start loading the trailer with water washed stones (as I did one weekend) you may well be confronted with an irate owner (as I was one weekend). You also find out quickly that rocks are heavy, and hard to lift.

I ended up buying water washed rocks at the quarry in Lumberville. I also found a farmer in the Green Lane area (lots of granite outcroppings) who would let me back up a rented low bed trailer and roll or coax a rock too heavy to lift onto the trailer.

I took all heavy materials, such as the rolls of sheet lead and rocks and stones to the site (the back yard), drove over the lawn and unloaded by sliding or rolling the load to the approximate final location.

Everything was now possible. Now we could really begin.

The general design consisted of a pool with stepping stones on the top terrace, a waterfall to a second pool on the middle terrace, a babbling brook to a third pool on the lower terrace, all surrounded with rocks and plants that look quite natural.

the mechanical and electrical aspects

The first step was the mechanical and electrical part (not too tough for me since I have an engineering background and work for a contractor). I installed electrical wire underground to a light in an oak tree for garden illumination, to the lower pool for the recirculating water pump, and to a couple of service outlets at the top terrace.

The system consists of two electrical circuits, one for the water recirculating pump, the other for the lights and service outlets. Each circuit is energized



Early construction view from pool looking up hill.

through an automatic timer. The pump is started at 7 am and stopped at 11 pm. The lights come on at dusk and go off at 11 pm. The wire is waterproof cable buried approximately four to six inches in the ground.

I installed plastic water piping underground to the lower pool. Water is fed into the lower pool through a valve, which is automatically turned off by a float when the pool is full. Water lost through evaporation and small leaks is, thereby, always added. Additional water piping was installed between the bottom pool and the top pool for water recirculation and to a couple of hose outlets at the top terrace. The system was designed to be drained in the winter. The piping, therefore, could be installed in a shallow trench and excavation kept to a minimum.

I did all of the digging and earthwork manually. As mentioned before, trenching for water piping and electrical cable was kept to a minimum. The general contour of the land was maintained. The terraces were already there. The pools are comparatively shallow. The excavated earth from the pools was used as fill in back of the rocks. Additional earth for this purpose was

brought in by wheelbarrow from an undeveloped adjoining property.

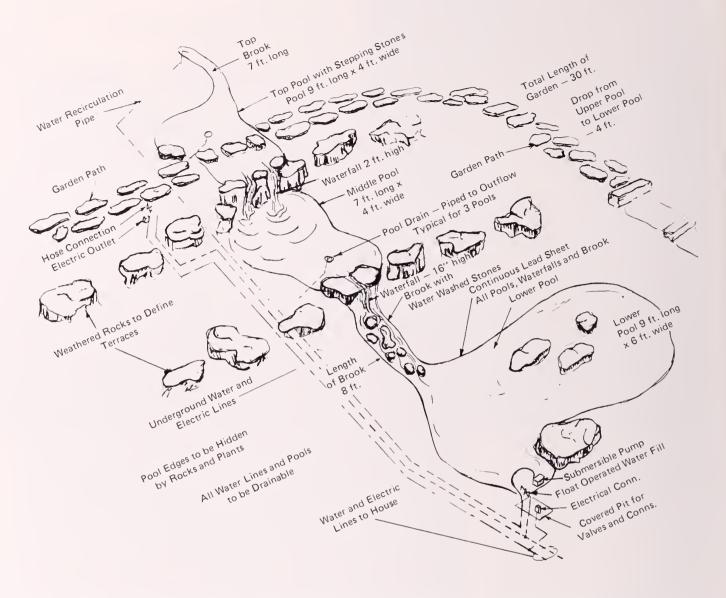
The entire pool, waterfall and brook system is one continuous lead sheet, molded in place and painstakingly soldered. (Not as easy as I thought it would be.)

Rocks were carefully selected and placed for the waterfall and for the brook. I had to imagine how water would flow over the rock and where it would hit to make the proper splashing and gurgling sounds—all of that while there was no water flow.

I placed rocks in position and then repositioned as I tried to visualize the final results. And then I had to bury and hide most of the rock that I had moved from the Green Lane area with much effort to achieve a natural look. (See "Planting Rocks" by Frederic Ballard, *Green Scene*, Sept. 1976.)

When the pools were finished and lined with water washed stones, the submersible recirculating pump in place, the water turned on, the leaks fixed, and all the electrical and mechanical kinks were worked out, the path through the garden constructed, an untold amount of top soil was brought in to fill in the back of the weathered rocks. Finally I was able to think about

continued



plants-what kind and where to get them.

The original planting concept was Japanese. We wanted dwarf evergreens that were to be kept pruned. The space between plants and rocks was to be filled in with ground covers. We depended upon the advice of the nursery that supplied plants to "Swiss Pines" in Phoenix ville.

The major planting elements consist of two Japanese cut leaf maples (Acer palmatum 'Dissectum') one red leaf, one green leaf, at each end of the lower pool; a dwarf Hinoki cypress (Chamaecyparis obtusa 'Nana'), in back of the lower pool. A pair of blue spruce (Picea pungens) flank the middle pool, and a cedar of Lebanon (Cedrus libani 'Stenocoma') is adjacent to the top pool. There is a weeping beech (Fagus sylvatica 'Pendula') on the left side of the garden on the lower level and a white dogwood (Cornus florida) on the upper level on the right side. A number of

dwarf Alberta spruce (Picea glauca 'Conica') are sprinkled through the garden. The iris are poolside. (See box for more complete plant listing.)

The construction period covered in this article took two years. The illustration shows various stages of construction. A garden bench has since been added, and the garden has been enlarged twice subsequently. The pool, waterfall and brook complex, is as originally designed, with annual leak repairs and minor modifications.

Sometimes, on a summer evening sitting on the garden bench listening to the soothing sounds of the water, watching the gold fish in the bottom pool (prized as hors d'oeuvres by local raccoon population), and noting how the plants have naturalized the area and hidden most of the construction (also most of the rocks), I think that sure was a crazy project, and I am pleased with the results.

Plants near pools and brook

Ground Covers

Ajuga reptans, carpet bugle Cotoneaster horizontalis, cotoneaster Juniperus horizontalis, creeping juniper Opuntia compressa, cactus Phlox subulata, creeping phlox Thymus vulgaris, thyme

Shrubs and Accent Plants

Buxus sempervirens, boxwood Corylus avellana 'Contorta,' hazel Iris kamferi, iris Iris sihirica iris

Iris tectorum, iris

Picea abies (varieties), bird's nest spruce Rhododendron spp., azaleas

Trees

Acer palmatum 'Dissectum,' Japanese cut leaf maple

Cedrus libani 'Stenocoma,' cedar of Lebanon

Chamaecyparis obtusa 'Nana,' dwarf Hinoki cypress

Cornus florida, white dogwood Fagus sylvatica 'Pendula,' weeping beech Picea glauca 'Conica,' dwarf Alberta spruce

Picea pungens, blue spruce

The Comforts of Comfrey

by Jan Riemer

Having been a victim of "that dreaded disease" with a full complement of cobalt treatments, I was naturally interested in any natural healing properties. Can you imagine my excitement when I found a plant reported to contain an ingredient that heals and restores damaged cells.

The plant is comfrey (Symphytum officinale) and the magic element contained within the roots and young leaves is called allantoin, which is responsible for growth and the multiplication of cells. Although there's still much to be learned about allantoin, scientists do know that pregnant women automatically manufacture allantoin during the early stages of the developing embryo.

planting comfrey

Once established, comfrey is hard to eradicate, but because it's extremely difficult to start from seed, we ordered a half dozen root cuttings. Spring is the preferred time to plant comfrey because it requires moisture, but our fall planting proved successful. We placed each cutting vertically in predug holes that allowed the tiny green leaves to peek through the soil, and spaced the plants 24 in. apart in loam that had been prepared with dolomite, some limestone, manure and wood ashes. After firming the soil securely around each plant, we soaked the bed and waited for spring.

As promised, the shoots were among the first plants to make their debut. Knowing that the allantoin travels from the roots into the baby leaves I lost no time gathering the tender growth, and served the leaves that tasted like asparagus and endive combined as a garnish in our salads.

As the plant developed into full size—about 3½ ft.—with majestic specimens of leaves that looked like elephant ears, the leaves become too coarse and hairy to eat raw, but our experimenting was just beginning. The more I learned about this herb, the more intriguing it became

After selecting the largest leaves and rinsing them clean, I steeped them in hot water for about 30 minutes along



with fresh catnip, lemon balm, mint, and laced the decoction with a taste of honey. It was not only delicious to the palate, but supplied a rich source of calcium, potassium, phosphorus, trace minerals, vitamins A and C and some B-12, which is rarely found in vegetables. According to Jethro Kloss in his book, *Back to Eden*, a tea made from comfrey leaves aids in scrofula, anemia, dysentery, diarrhea, leukorrhea and dysmenorrhea.

Comfrey has almost as many common names as it has uses-Quaker comfrey, Russian comfrey, gumplant, prickly, healing herb, blackwort, slippery root and knitbone. Working on the premise that it did heal sprains, bruises and broken bones I began an experiment on a friend who had broken a finger. Six weeks after having medical treatment, it remained painful, swollen and unbendable. In desperation she was willing to resort to the remedy used during the Middle Ages for mending broken bones and battle wounds. Fortunately, the timing was perfect as I was about to make the first of six cuttings that is required during the first year's growth. (The following years need only five cuttings, always leaving 2 in. so the root isn't damaged.) Daily, I delivered the fresh leaves, which she chopped and made into a thick paste by adding a little water. After wrapping the mixture in a clean gauze she tied it onto her finger where it remained when she went to bed. At the end of the week the swelling and stiffness had disappeared and her finger was virtually healed.

no waste

There's never any waste to comfrey. After making other cuttings, I stored some of the medium size leaves by freezing them. The largest leaves were either hung to dry or placed in a 150° oven until they became crisp and

crunchy. After removing the center membrane, I stored the mixture in a tight container to be used during the winter in teas, casseroles and homemade soups. And for variety, I brewed up a batch of leaves that were strained and placed in the freezer. If the tea isn't frozen it eventually becomes rancid and emits an odor resembling rotten eggs.

You have probably correctly surmised that the verdant crop of six plants developed beyond all my expectations. In fact, the excess was almost too much to handle, so I borrowed an idea from organic gardeners who raise comfrey for the sole purpose of enriching the compost heap. Had we owned a farm, the comfrey would have also been used for a perennial fodder crop.

My storage efforts weren't in vain, as I had an occasion to use the defrosted leaves as a compress to aid in healing a painful knee condition. And when the doctors couldn't diagnose or treat a body rash, the itching was relieved and the rash eventually faded after three daily applications of the defrosted tea.

Because the nutritional value in comfrey is much more pronounced before flowering, we've never seen the blossoms that produce well-shaped flowers in shades of yellow, mauve, blue or white, but I plan to transplant the prolific growth and use some of it as a handsome border plant. When that needs thinning, I'll take the valuable roots, dry them, and grind into a powder which, when dissolved in water to form a mucilage and applied directly to bruises, sprains, broken bones and insect bites, is considered more effective than the leaves.

My all-purpose comfrey is truly a comfort.

Jan Riemer is a frequent contributor to *Green Scene*.

The Horticultural Photographer

by L. Wilbur Zimmerman

I am going to assume that the reader has some knowledge of photographic principles and techniques as well as how to operate a camera.

To further simplify the scope of this article, discussion is limited to the use of the modern single lens reflex (SLR) cameras and 35 mm film. Other cameras such as the 35 mm range finder or the larger format bellows type camera can be used but they each have certain limitations, which make them less adaptable and less convenient than the SLR camera.

What we are interested in here is photographing a garden or a part of it. The following comments about lenses are just as applicable whether you are using black and white or color film.

For the general garden shot a lens of 35 mm focal length, which is considered a medium wide angle, is a basic tool. In crowded areas a 28 mm, 24 mm or even 20 mm can be used to advantage. This is especially true if there is no architectural structure in the picture area, because converging lines or similar distortion, which are more likely with very wide angles, can be a disturbing factor.

There is no question that you can obtain superior results if you use a good tripod. A tripod compels more serious attention to composition, and you are certain to get sharper pictures without the movement inherent in hand-held exposures. If circumstances are such that a tripod is not feasible, then it's best to use a shutter speed no slower than 1/125. Be alert to breezes. Flower movement can cause blurring if the wind velocity is greater than five to seven miles per hour. If it is necessary to take pictures even though it may be windy, step up the shutter speed to 1/250th or even 1/500th of a second. That will probably require opening the lens aperture too wide to give sufficient depth of field. Then use a high speed ASA 400 film. That will make it possible to use a smaller diaphragm opening, which is desirable to achieve the greater depth of field. Other things being equal, it is best to use a lens

opening of F/16 or F/8 to get the flowers in the foreground and in the background in sharp focus. No discussion is being offered here about the background other than that supplied by the garden itself. Fences and hedges cut down on distracting backgrounds.

If you are not shooting in color, the black and white panchromatic film with a speed of ASA 100 is recommended. In order to obtain a better color contrast for a black and white print, a 2x yellow or green filter enhances the effect. For more information a little study of specialized photo treatises on the use of filters will be very helpful.

In the use of color film, a slow film (ASA 25) will give the finest grain.

Under adverse light conditions, however, color film of speed ASA 400 will give surprisingly good results although not as fine a grain.

light

Consider the character of the light when photographing outdoors. Midday sunlight is usually too harsh, creating deep shadows devoid of detail and washed out highlights. At any time of day taking pictures with the sunlight at your back makes for flat lighting and greatly reduces the sense of three dimensional form. To avoid this, photograph out of doors before 10 am and after 3 pm, and from such a position that the object you are photographing will have the light falling upon it either



Cameras and Some Equipment

Clockwise starting with camera in upper left hand:

Camera with 35 mm semi-wide angle lens, also showing a right angle viewing device fastened to regular view finder for when camera is used at ground level.

Other camera has long focus lens which has macro capability and also shows a hand grip and holder for flash gun.

A spot meter and a combined incident and reflected light meter.

Flash gun-automatic sensor with reflecting cardboard mount.

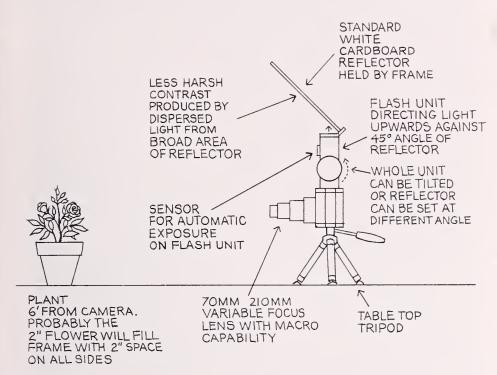
Wide angle lens 21 mm

 $4\ \text{extension}$ rings for using regular lens for close-ups. Bellows attachment for extreme close-ups.

Flash ring light for close-up lighting of certain kinds.

Collapsible reflector for flash bulbs.

Small tripod with sliding track for moving the camera position in close-up work.



MEDIUM CLOSE-UP USING A BOUNCE FLASH

from the left or right side. In this manner the shadows will be directed so as to define form. An exception to this is a bright overcast day when shadows are not sharply defined. At that time suitable pictures can be made from almost any angle. One notable distinction between color and black and white film, aside from the depiction of color or lack of it, is that black and white film affords better gradations from highlight to shadow than color film. That is another reason why with color film it is so essential to avoid the time of day when contrasts are greater; the film cannot adequately record the gradation of the extreme range from bright light to deepest shadow.

close-ups

The next item is that of taking closeups of small flowers or even a portion of a small flower. That includes anything from a whole sunflower to a single floret of the head of an astilbe.

I must reiterate: a tripod is definitely essential for close-up photography. No one can hold a camera steady enough when any degree of magnification is required. The slighest tremor is exaggerated into a wide swing on the film when long focus and magnification are combined. The slightest movement means the image won't be sharp. An additional

aid is a track mounted on the tripod head permitting small adjustments of distance from camera to subject.

There are several options for closeup work. Supplementary lenses of one to 10 diopters can be used mounted in front of the camera lens to bring the subject closer. These lenses are not as sharp at wider apertures and should be stopped down considerably (use lower F stop) to achieve a desirable degree of resolution. The macro lens is better because you can move the camera to within 2 in. to 4 in. of the subject. A 90 mm macro is preferred because you don't have to get so close to the plant that the camera or operator will cast a shadow. Extension tubes are available which, when placed between the lens and camera, make it possible to use a normal lens for getting close-ups. Such extensions change the reading of the F stop numbers on the diaphragm ring of the lens barrel, but a-through-thelens meter with automatic lens obviates this as a problem when determining exposure.

A bellows extension, interposed between the lens and the camera body, can vary magnification and is suitable for normal outdoor lighting. These extensions are most useful for photographing the smallest subjects. Another variation is the newer variable long focus

lens available with a macro capability. It permits the photographer to be a distance away from the small object and still to obtain a large image on the reflex finder or to vary the size of the image. A 70 mm to 200 mm variable focus telephoto is a good range to select for this purpose. The exposure can be read by the through-the-lens meter for outdoor light as with any focal length lens. For indoors, flash photography requires some special calculation to determine the true F stop or diaphragm opening unless a flash meter is used. Automatic flash exposure units are also available.

If close-up pictures are to be taken by other artificial light a different set of circumstances prevail.

Photoflood lamps or other kinds of incandescent bulbs can be used on light stands or a copying stand. Such light sources may require special filters for color work as the color temperature varies with different bulbs. Also incandescent bulbs of any kind change their spectral output as they age by use. And finally, a very practical problem: heat can cause flowers to wilt rapidly when lights are close.

The most convenient, compact and efficient choice of artificial lighting comes down to either photoflash bulbs or electronic flash. The more sophisticated electronic flash units adjust themselves so that the proper amount of light reaches the object and is reflected back to a sensor to give correct exposure. Since light strength varies as to the square of the distance from its source, all the other methods require tables and careful calculations to arrive at correct exposure.

One refinement in artificial lighting is to use an automatic flash unit with a piece of white cardboard, $8 \text{ in. } \times 10 \text{ in.,}$ set at an angle at 45° to the flash unit which faces straight up in the air, to provide a reflected light (see illustration). This dispersal cuts the intensity of the light by $2\frac{1}{2}$ times. In close-up work where the subject is only a few feet from camera the light is powerful enough to use a relatively small F stop.

Photographer continued

This is also known as a bounce light. A special umbrella with a silvered inside lining can be used in this way too. Dispersed lighting makes the subject stand out more clearly and is a desirable combination of good lighting with the convenience of automation.

A man in California who has taken more than 40,000 close-up color slides of orchid flowers uses a bellows and a telezoom, macro combination lens for extreme close-ups. He employs a system of three synchronized flash units. The combination with his standard background of black has produced the best all around color rendition for color reproductions. A flash meter is used to measure each exposure and one picture is taken at that reading and one at ½ stop above and one at a full stop below. This method of bracketing exposure is well worth the cost of the film to be assured of the nearest perfect exposure in any kind of photography. Such a method is probably the most deluxe of all those described here and is mentioned only to show what can be done.

I have used all these methods except the last one. I too would recommend a black background. In my opinion the simplest and most generally useful method for close-ups is the telezoommacro lens in conjunction with the bounce reflector and automatic flash. As the photographer gets into this fascinating field he will find experimenting on his own will lead to uncharted and surprisingly interesting results.

L. Wilbur Zimmerman is the chairman of the PHS Council. He was chairman of the Philadelphia Flower & Garden Show in 1974 and 75. He is an avid photographer and an orchid enthusiast. Zimmerman began playing around with photography when he was 12 years old, using a Graflex. He was chairman of the Miniature Camera Club of Philadelphia, International Photographic Salon in 1939.



Swamp hyacinth, Helonias bullata



Lobelia cardinalis

Shooting at the Philadelphia Flower & Garden Show

For people who wish to take photographs at the Philadelphia Flower and Garden Show, most of the procedures outlined here apply. There are some special differences, however. The lighting is a mixture of fluorescent and incandescent which, while it is a good mix for the human eye to appreciate color, is a problem from a spectral standpoint for film to record. Ordinarily, daylight film with a filter, or color film designed for artificial light, would seem the logical solution. But depending upon the closeness of the area being photographed to either a preponderance of incandescent or fluorescent light, which determines the spectral makeup of the light, the distorted colors may or may not be pleasing. The photographs would have an overall hue of orange-gold or a slightly muddy cast.

Until recently the problem was insoluble. However, the recently introduced Kodacolor 400 negative film (ASA 400) designed for making prints, gives surprisingly good color. I have not used the

other brands of color ASA 400 films either negative or positive; they might do just as well.

If you are using flash close-up, of course, you can use a regular color film of any speed, negative or positive.

If the purpose is just to take overall views or photographs of whole exhibits, an SLR with a wide angle lens of 20 mm or 24 mm will be best. With a tripod, shutter speeds low enough to use the available light can be used. In this way a small diaphragm opening can be used also. Flash cannot cover wide and distant areas with sufficient light.

A 35 mm or 50 mm focal length will not include enough of the scene because you won't be able to back away far enough. A 20 mm, 24 mm or 28 mm is more satisfactory.

If the purpose is to get close-ups of niches or single plant specimens, then the reflector flash with a medium range zoom would be best.

If you want to do all these things,

two cameras would be a great convenience. You would not have to change lenses for the variations in distance and sizes of areas to be photographed. When using an automatic flash, be sure the unit has enough power to carry the distance and in the case of the bounce flash to accommodate the 2½ times reduction in usable light. Incidentally, the bounce light pretty well takes care of the extreme wide angle photo if the distance is not too great. Wide angle lens use presents a problem of fall-off in illumination at the edges with straight forward flash. With very wide angles a tripod is better, although with the flash, when the shot is close, handheld exposures are satisfactory.

How do you get pictures when there are too many people near your subject? Become an exhibitor so you will be eligible to come in early Saturday morning before judging or early Sunday morning, the opening days of the Show.

GLOSSARY

ASA:

All film has an ASA number which makes it easier for photographers to calculate exposure time. The ASA number is set on a dial on the exposure meter. The ASA or speed number expresses the film's sensitivity to light. The higher the number, the more sensitive and faster the film. Other factors being equal, the faster the film (ASA 400 is very fast; ASA 25 is slow), the shorter the exposure and consequently the less danger of blur due to accidental movement; the smaller the diaphragm stop that can be used, the greater the extent of sharpness in depth.

Bellows:

A collapsible cloth or cardboard tube placed between the lens and film in a camera (or enlarger); the image can be focused by contracting or expanding the bellows.

Bracket:

A way to ensure a well-exposed negative; an exposure is taken according to a light-meter reading, then another one half or a full stop higher (smaller diaphragm opening) or lower (larger diaphragm opening) than the original, allowing more or less light into the film.

Depth of Field: When the camera lens is focused on a particular object, the image is sharp. Other objects near the sharpest image or further away are softer, or blurred. Depth of field is the zone from the point closest to the camera to the point farthest from the camera that is acceptably in focus.

f-stop:

Relative aperture, the measure of lens speed, is expressed in f-stops. The f-number is a fraction: an aperture with a diameter equal to 1/8 the focal length is f/8; one that is 1/2 the focal length is f/2. At f/8 the aperture of an 8 in. lens is one inch

across; so is f/2 on a 2-in. focal-length lens.

Filter: A color filter changes the response of a photographic emulsion to light and color. Its function is to alter the rendition of color in terms of either black and white or color to produce a picture that is clearer, more accurate, more interesting, or more beautiful

than it would be if no filter were used.

Grain:

In general, slower films either in black or white or color (as shown by their ASA ratings) are finer grain than faster emulsions. This is not as pronounced a difference as it once was. The slightly mealy appearance of the image or negative is evidence of grain and is most noticeable on enlarged prints and is less pleasant than a sharp image. Overexposed negatives can also give a more grainy appearance. The reason is a greater clumping together of the silver particles in the film emulsion during development.

Stop Down:

To stop down means to reduce the f stop or diaphragm from a wider opening, e.g., from the f/2 position to f/8. The smaller opening increases the apparent depth of field, allowing a sharper image. Increasing or decreasing the f-stop is an important factor in exposure since the diaphragm controls the amount of light passing through the lens.

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L. Wilbur Zimmerman

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The Complete Photographer, Andreas Feininger, Prentice-Hall, (1965), 9th printing 1971.

The Craft of Photography (Updated Edition), David Vestal, Harper, Colophon Books, 1975.



The date palm air layered.

Phoenix dactylifera

PLANT FINDER

for is extinct?

After reading George Elbert's article about air layering the parlor palm (Chamaedorea elegans), I thought the following facts might explain why the palm air layered so easily. In its native jungles in Mexico, the parlor palm grows as tall as its narrow stem will permit. It then falls over, roots, and grows up again. The process is repeated again and again. Thus it is well adapted to air layering. The low light levels on the floor of these dense jungles is also

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The new palm potted. It began to grow immediately.

one of the reasons this palm does so well in the "parlors" of our often dimly lit homes.

I had an experience similar to Elbert's but my purpose was different. Elbert wanted to air layer his parlor palm to rejuvenate a dying plant and reduce its size. I wanted to produce a younger, smaller root system and to reduce the overall vigor of the plant, a date palm (Phoenix dactylifera). Its roots had become so large and tough that they were

breaking its tub apart. In fact, the palm was simply too large in every dimension for its quarters.

I expected the procedure to work because there was evidence of roots or bumps along the trunk.

The palm had been grown from the seed of a date some ten years earlier. To stimulate roots I sawed halfway through the 8-in. stem. The trunk just above the cut was dusted with the root hormone powder "Hormodine" and covered with damp sphagnum moss. That was covered with moist polyethylene film to retain moisture.

This series of photographs illustrates just how broad the application can be regardless of age and size. The condition of an old stem need not be a barrier, the object being to control vigor by reducing the size of the specimen. If this procedure were to be carried out periodically, many valuable horticultural and botanical specimens could be maintained within a confined space indefinitely. That holds true for a wide range of plants other than palms, though their root formation might take longer than the palms'.

Charles O. Cresson

Charles O. Cresson was trained at universities in England and Vermont as well as at Longwood Gardens and at the Royal Horticultural Societies Garden at Wisley, England. He now designs gardens and has an advisory service in the Delaware Valley as well as maintaining an old family garden with a large plant collection in Swarthmore.

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Cover:





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Front Cover:	Pink carioca. See page 3. photo by Julie Morris

Primula heladoxa (candelabra). See page 21.

photo by Dee Peck

come on and plant the carioca!



by Julie Morris

Last summer I watched a seedling as it tried to grow in a crack in the cement sidewalk next to a neighbor's house. The plant took hold and flourished. As soon as I realized that it was a snapdragon I became more interested in its progress. By early July the plant was in full bloom and it continued to flower for some weeks until a hot dry spell in August took its toll.

I was surprised that the plant was so hardy. I had thought that snapdragons needed the rich, well drained soils preferred by most bedding plants.

Like all snaps, Carioca's color ranges widely from white, pink and yellow through bronze, rose, and red shades.

I decided to do some reading about snapdragons and found an interesting note in Louise Beebe Wilder's book, The Garden in Color. Wilder writes about the many varieties of garden snapdragons: "These are all forms of Antirrhinum majus, the flower one sees clinging to the walls of old ruins in chalk districts of England with Wallflowers."

The mystery of the plant's success was solved. The rubble beneath the sidewalk provided good drainage and the limestone in the foundation of the house no doubt leached into what soil there was, providing the conditions needed for good growth. The early summer was very rainy so moisture was no problem.

There was a method to my snapdragon madness in the summer of '79. I was trying several different kinds of snapdragons in my clients' gardens and wanted to know about these versatile plants. I also had grown the midsized

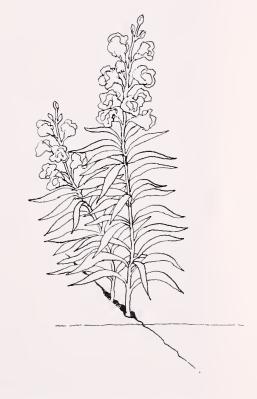
Carioca series from seed for the first time.

The five varieties I used in the gardens last summer ranged from the tall growing Rocket series to the low growing mounds of Floral Carpet. The Rocket snaps can reach 36 in, and are favored by flower arrangers who use the tall spikes in combination with the large flowered dahlias, asters and other "cushiony" flowers. The Rockets continue blooming throughout the summer if the flowers are cut before they fade. Cool fall weather usually brings strong, new growth and new blooms that continue until Thanksgiving, barring a really hard frost. Rocket snaps must be staked and carefully tied and retied, and probably tied again throughout the season. I use the thin green string. miles of it before the summer is over. I have also used the new twiststem type of tie that comes in a can, but prefer the string, which I can keep in my pocket and pull out as needed. Without staking and tying, the Rockets soon careen out of shape and control. Generally, I plant the Rockets in the cutting garden and, unless I need their height, use the other kinds of snapdragons in the flower borders.

Carioca is the variety I found thanks to PHS member Susie Plimpton, It grows to 20 in. and branches from the base. The plants are very bushy producing as many as 15 spikes at a time, and they don't need to be staked. Like all snaps Carioca's color ranges widely from white, pink and yellow through the bronze, rose and red shades. Appleblossom is a lovely pink-edged white form. Carioca is an excellent cut flower and less formidable than the Rocket snaps.

mistaken identity

In the spring of 1978, I bought some continued





Perennial border at Temple University, Ambler Campus.



Yellow Carioca

plants labeled Pixie and planted them as edging plants. The tight mounds of clear colored flowers bloomed through November. Some of the plants lived over the winter and bloomed again last summer. I bought more Pixie last summer and soon realized that the dainty, open-faced flowers were not the same Pixie I had planted the year before. A little research in 1978 would have shown me that I had Floral Carpet, not Pixie, The flowers of Floral Carpet are the old-fashioned "snapping" snapdragons, not the newer open-faced flowers. Floral Carpet plants are sturdy and grow in compact mounds that reach about 8 in, in height. The 8-in, Pixie and its taller growing look alike, Little Darling, are base branching plants that I like to tuck here and there in the border. Both varieties are good fillers in flower arrangements. I used them in the border in combination with cactus flowered asters, feverfew, ageratum, verbena, petunias, scabiosa, Peter Pan zinnias and dwarf dahlias.

Snapdragons prefer a light, sandy soil. If the pH of the soil is below 6.0, I add ground limestone; for example, if the pH reading is 5.8 add two pounds of lime to every 100 square feet (1 cup



Pink and white

of limestone = 1 pound). For best results send a soil sample to Pennsylvania State University for testing. Your cooperative extension agent has the soil test bags. Apply lime at planting time and again in the fall. I fertilize the soil in May with 5-10-10 or 5-10-5

"Snapdragons are grand wall plants, both in the sun and shade. I think the tender colourings, white, yellow, and pinkish, are the most suitable for the cool exposure, and the fine dark crimson reds and mixed colourings for the warm one."

—Gertrude Jekyll Wall and Water Gardening, New York, 1901. (page 33)

(2-4 lbs./100 sq. ft.) depending on soil test results. I make a second application about eight weeks after planting.

I have never seen Carioca in a garden center so I start them from seed sown from mid-February to mid-March. I use milled sphagnum moss as the starting medium. Snapdragon seeds are very tiny, ants often carry them off in

the garden, so you have to be careful not to lose them. I transplant the seedlings into peat pots when they are about 1 in.-1½ in. high. When the plants are about 4 in. high, start pinching the growing tips to produce bushy plants. After hardening off, the plants can be set in the garden by mid-May.

Aphids can be a problem for snapdragons, although they seem to prefer other flowers in my garden. Malathion will control aphids. Snapdragons are subject to various rust and other fungus problems, especially if there isn't good air circulation in the garden or if there is a prolonged wet spell. Zineb is a good control.

As Louise Beebe Wilder noted there are many varieties of snapdragons coming in all shapes, sizes and a wide range of colors. The new butterfly types have open ruffled flowers, the tiny Tom Thumb and Magic Carpet are suitable for wall gardens and the stately Rockets are the backbone of the cutting garden. The Carioca series is perhaps the most versatile snap I have grown. The seed is available in separate colors. The plants are lovely additions to the herbaceous border and the flowers brighten up any summer bouquet.

Sources

Carioca series — Stokes Seeds, 737 Main St., Box 548, Buffalo, NY 14240

Other varieties:

Park Seed, Greenwood, SC 29647 Burpee Seeds, 1720 Burpee Bldg., Warminster, PA 18974 Thompson and Morgan, Dept. 16, Box 100, Farmingdale, NJ 07727

Additional Reading

Colour Schemes for the Flower Garden, Gertrude Jekyll, Chas. Scribner's Sons, New York, 1919.

The Garden in Color, Louise Beebe Wilder, The Macmillan Co., New York, 1937.

The Complete Book of Growing Plants From Seed, Elda Haring, Hawthorn Books, Inc., New York, 1967.

Haring suggests the following mixture for starting seeds: Equal parts of milled sphagnum, vermiculite and perlite. The mixture should be moist (use warm water for easier mixing) before use. Once the second set of leaves has appeared on the seedlings, fertilize with a liquid fertilizer mixed to half the recommended strength.

Julie Morris is a garden consultant in Newport, Rhode Island. She is currently working with the Newport College to develop a fouryear horticultural program. Julie gardened in the Philadelphia area for many years. She first learned how well snapdragons grow here under the tutelage of Viola Anders when she studied with her at Temple University, Ambler Campus.

Seven Unusual Perennials for the Garden

by H. Peter Loewer



Artemesia lactwort on the right.

On the afternoon that I begin to write this article, the winter wind pushes along at about 30 mph and the thermometer sits at 10°F. The landscape, without snow, can best be described as barren, Jolly old Mr. Sun shines on us, and my heart longs for a day in the garden: feet in dirt-clogged shoes, hands stained with earth, the sweet smells of spring, and the body surrounded with a multitude of tools waiting to be used, maybe even lost. Along with these green thoughts of a garden, the mind pines for a new face among the familiar flowers—the old war horses of the border: there must be a greater choice of plants than petunias, peonies, and phlox.

Well there are other choices, though many nurseries and garden centers still work within narrow horizons and try not to admit to their existence. I venture to suggest here the following seven plants (all readily available) to those gardeners who are unfamiliar with them and who wish to add something new to their flower border or cutting garden.

The first is the white or sweet mugwort (Artemisia lactiflora), a perennial herb that grows to a height of 4 or 5 ft. and looks more like a bush than a flowering plant. This particular quality makes it an excellent choice for the back of a border and, in addition, the stems are strong enough to withstand high winds without breaking. The chief assets are the creamy-white plumes of flowers that appear in late July and last well into August, Excellent as cut flowers, they emit a sweet perfume and are very popular with bees. Japanese beetles also find the blooms to their liking and the first sign of their emergence in our garden is when the glistening-green bombshells are found clinging to the mugwort, where they are easily tipped into a can of kerosene.

The unusual common name stems from a near relative of white mugwort,

the common mugwort (A. vulgaris) which was used in the preparation of beer way back when. The "mug" is obvious; the "wort" refers to an infusion of sweetened malt that ferments to form the beer and to which the leaves of this plant were added, presumedly for flavoring.

Sweet mugwort comes into its own when grown in heavy or clay soil so don't make any special soil mixes or embark on lengthy feats of preparation if you plant it in an average garden. Just give it full sun, a reasonable amount of water, and hack it into smaller sections in early spring if it becomes too large and ungainly. The dead stems may be left for the winter garden and cut to the ground when the snows melt.

Many good and human things are connected with being a gardener. I don't think any dictators have ever been worthwhile men-of-the-soil (although some have gone heavily into orchids); poor politicians find it impossible to succeed with plants; and while your failures simply wither away, your successes shine for all the world to marvel at.

My second choice falls into the "marvel category": it's called the slipper flower or *Calceolaria*. Most people are familiar with the greenhouse types that are grown for gift-giving but few have seen the alpine species since most garden books never mention them and when they are noted, they're usually said to be chancy with the average gardener.

Two years ago, I sent for a plant of *Calceolaria* x 'John Innes' and placed it where it gets afternoon sun, in moist but well-drained soil. I was rewarded with six flowers about the middle of July.

In the fall, I gave it a pine-branch mulch and hoped for the best. Imagine my surprise when last year it sported over 50 blooms and put on a dazzling display for almost a full month.

The large golden slippers are minutely speckled with red and stand about 6 in.

high on slender stems. They survive heavy rains without breaking off. When visitors wander about the garden, they always remark: "How can anything so beautiful be hardy in a climate like ours?" And our climate is a bad Zone 5 (Cochecton Center, N.Y.) with temperatures that have gone to 20° below 0°F on a few occasions. The plant itself disappears by late summer so mark its position with care.

a garden worthy

One of the fine garden worthies is the obedience plant (Physostegia virginiana). The flowers do not begin to bloom until September (in our Catskill Mountains) and have a tenacious knack of surviving frost. The floral spikes will grow up to 3 ft. tall in any reasonable soil and are called obedient because the individual blossoms can be pushed about the axis of the stem and will remain in the last position until you give them another tap with your finger.

Physostegia has to be watched in the garden as it can easily spread by creeping roots and invade areas where it isn't wanted. But this is a fine plant for that damp location where other plants have not succeeded and any extras are easily dug up for friends.

There is a white form ('Alba') not quite as "weedy." It is considered by many to be more demure than the rosemagenta color of the typical plant, but it is not as tough and soil conditions must be better, including superior drainage.

A pink-flowered variety with variegated green and white foliage is found at some nurseries, but the old standby remains my favorite.

Seeded plants will give flowers ranging from the hottest magenta to the palest of pink, so choose your favorite then destroy the remainder and propagate future plants by division.

Physostegia makes an excellent cut flower and, I am told, is appreciated by flower arrangers since all the blossoms on any stem can be manipulated to follow any plane in the arrangement. It is also a native American wild flower often found in wet woods and thickets.

Most people do not think of grasses when they consider garden plants, and they are missing a bet when they don't. There are dozens, of course, of ornamental grasses that would fit beautifully into any garden plan but even among those I have favorites and the Eulalia grasses (Miscanthus sinensis) are paramount among them.

These are a genus of plants represented by two species and many varieties that are extensively cultivated in

Many good and human things are connected with being a gardener. I don't think any dictators have ever been worthwhile men-of-thesoil (although some have gone heavily into orchids); poor politicians find it impossible to succeed with plants; and while your failures simply wither away, your successes shine for all the world to marvel at.

gardens throughout the world. Eulalias grow very tall and produce magnificent plumes of silvery spikelets as the days shorten into fall, and its flowers are wonders for winter bouquets. About the only problem with these grasses is placement. Within a few years of growth, they can easily overwhelm the landscape. Plant one just outside the kitchen window and by year three, you'll have a room so dark that lights are needed at high noon.

Of all the types though, zebra grass (M. sinensis 'Zebrinus') tops my list. It's a delight to any gardener who suffers through a northern winter. One is hard put to believe that any grass with such a tropical look could succeed where temperatures ever fall below freezing, even for an instant. The individual leaves are not striped but dashed with horizontal bands of a light, golden-brown, and massive clumps are

formed over the years with a true, fountainlike effect. The flowers are merely an added bonus.

While full sun is required for maximum growth, zebra grass will persist even in damp soil, making it an excellent choice for the poolside. If any leaves sprout without the colored bands (and be patient at the year's beginning, as the variations of color are slow to appear) be sure to cut them off so only the variegated forms have a chance to grow.

Divide mature clumps in early spring, and best use an ax or hatchet as these plants are tough. And, once again, be warned: the first few years produce small clumps, but they soon start to grow and spread.

I always leave the stalks to winter over, as the golden-brown leaves of autumn relieve the harshness of the January landscape. The plants can easily be cut down to earth before growth begins in spring.

beard-tongues

Beard-tongues (Penstemon spp.) are one of the largest genus of wildflowers in the world, representing more than 230 species and all belonging to the great Scrophulariaceae or the Figwort family. Its close garden relatives are the snapdragons and the floxgloves.

My introduction to these flowers came with seed provided by Bebe Miles when I needed specimens for illustrations to her grand book, Wildflower Perennials for Your Garden. The seeds sprouted with ease and produced flowering plants of *Penstemon hirsutus* for the first garden season (the plant stem is covered with fine, white hairs, hence the botanical name). They prefer dry, rocky soil and if cut back after the first period of blooming will go on to produce a second. The flowers consist of clusters of white and lavender blooms about an inch long on stems up to 18 in. in height, with dozens of buds on each stem; thus a clump produces quite a floral display.

Seven Unusual Perennials for the Garden continued



Eryngium maritimum



Physostegia virginiana



Calceolaria 'John Innes'

The basal rosette of leaves is evergreen (here in the mountains, only with snow cover) and they have a purplish cast as the days and nights grow colder.

While I give a source for a miniature variety of *P. hirsutus* at the end of this article, I've yet to find a source for the standard plant. That is, however, no problem, as they grow so well from seed. So why not take this as a challenge to broadening horizons and seek out the American Penstemon Society (P.O. Box 450, Briarcliff Manor, N.Y. 10510) and their seed exchange facilities? These plants do seed around, so remove the flower heads before seed is set.

Sixth on my list is a charming and beautiful flower, from a family of charming and beautiful flowers: the Japanese columbine (Aquilegia flabellata pumila). Often called A. akitensis in many garden catalogs, a columbine by any other name is still a winning addition to your garden.

The plant grows 6 to 8 in. high and likes a moist, well-drained soil and, because of drainage requirements, is often listed as a rock garden plant. Even after blooming, it should enjoy an honored spot in your border, as the fresh green leaves are attractive all summer long. Leaf miner is the only problem, as with all columbines. The larvae tunnel their way through the leaves, making the grey, thread-like tracings that detract from the plant's beauty. Remove the infected leaves or, if you must, spray.

Which leads us to the blossoms of shades of lavender-blue with a creamy-white cup. These make one sad that the English language has so few words with the punch of beautiful. Many flowers will appear on one stem, opening about mid-May.

Plant seven is always a shock on first viewing. "Good heavens," visitors will say, "What is that?" That is the sea holly (*Eryngium maritimum*), one of the fascinating family of over 200

perennial herbs that are in essence, beautiful thistles.

The long-lasting flower heads make welcome additions to winter bouquets as the common garden varieties produce abundant prickly flower heads that glow with a metallic-blue sheen.

Other special eryngiums: *E. planum* 'Violettum' blooms in July, preferring hot sun and dry, well-drained soil. They reach a height of between 2½ to 3 ft.

E. alpinum has dark blue-green basal leaves with flower heads of steel-blue. E. giganteum grows up to 4 ft. high producing silver-blue flower heads but



is monocarpic so grow it as a biennial. All the plants are easy to grow from seed.

Of the seven plants I've described, the sea holly will probably elicit the most surprise: a plant with attractive foliage that is surmounted with myriad heads of steely-blue thistles usually is not found in the average garden; the calceolaria will, I think, be the most wanted although the Japanese columbine might well take that position; the mugwort and physostegia have a wild

quality that more finicky gardeners might eschew; zebra grass obviously requires a larger than average plot of land; and the penstemon can become a passion as witnessed by the Society that bears their name.

I am one gardener, though, who hopes that others will try branching out by growing a few of the plants described thus multiplying beauty into other neighborhoods and climes. We all might as well, you know; the infamous other side continues to multiply concrete, plastic, and other questionable aides of civilization too numerous to mention; every gardener should have his day.

Sources:

Artemisia lactiflora. Garden Place, 6780 Heisley Road, Menor, Ohio 44060; Wayside Gardens, Hodges, South Carolina 29695 Calceolaria x 'John Innes'. Lamb Nurseries, E.101 Sharp Avenue, Spokane, Washington 99202

Physostegia virginiana. White Flower Farm, Litchfield, Connecticut 06759 Miscanthus sinensis 'Zebrinus.' Garden Place

Miscanthus sinensis 'Zebrinus.' Garden Place Aquilegia flabellata pumila. Miniature Gardens, Box 757, Stony Plain, Alberta, Canada TOE 2GO

Eryngium planum 'Violettum.' Garden Place*

*The Royal Horticultural Society lists five or six eryngium species as seeds in their 1980 Seed Exchange. The serious and adventurous gardener should join RHS to take advantage of their fine magazine and seed exchange. Peter Loewer

Ed.note: Adventurous and serious gardeners should also consult our plant finders column, on page 20, a new feature beginning in this issue of *Green Scene*.

Peter Loewer is a botanical artist and scientific illustrator who became enamoured with gardening and writes and illustrates his own books. He lives near the Upper Delaware River and also edits a small upstate New York newspaper.

Among his books are: Growing and Decorating with Grasses, Walker & Co., N.Y. 1977. Illustrated only: Wildflower Perennials for Your Garden, Bebe Miles, Hawthorne Books, N.Y. 1976.

These and two others may be found in the PHS Library.

Summering the Houseplants Under the Grape Arbor at Wyck



When I first really observed the old grape arbor at Wyck in Germantown with a critical eye, what I saw made me glad that no photograph remains to show the slanting eroded place where three or four leftover Christmas poinsettias, Easter azaleas and a broken sanseveria sadly leaned. The great sweet gum tree soared up over the house shading the grapevine. The lower limbs of the tree were festooned with large grape leaves making a dark cave of the brick-paved area surrounding the old pump outside the kitchen end of the house.

The next summer a two or three inch grading of pebbles and a better edging of Germantown field stone made a firmer place where I wanted to put pots of houseplants in a level position (important for watering as well as appearance). I didn't then know much about pruning grapevines, but just for the sake of neatness it was pruned and more light came through. The hardy ferns that grow like weeds at Wyck came up along the edging of gray stones. All the grasses and other weeds were kept out of the crevices between the beautiful old heavy worn bricks. I learned how to get the weeds completely out by inserting a screwdriver and wiggling the brick until the roots loosened. Cutting or scraping with a pointed trowel or knife just seems to strengthen the weed. Weeding the bricks under the arbor is a slow and cool job for a hot day.

It soon became evident that the sweet gum had been damaged by lightning and was rotting in the center. It stood dangerously close to the house, which had recently been reroofed and repaired. Several weeks after the tree had been painstakingly lowered, limb by limb on account of the arbor underneath, the freak March storm in 1976,

almost a hurricane, came through Germantown from the west felling many trees and doing great damage. We lost a large paulownia only yards away. Grateful for our foresight we turned our attention to relaying the bricks, which the roots of the old tree had pushed up into long mountains and valleys. Finally the ground was leveled and the lawn grew up to the neat curve of bricks that sloped to join the runoff from the old pump. The pump doesn't work, so impatiens did well in the stone

Day by day we have to remove the twigs the mocking birds bring at nest building time, and at night by the light of a flashlight we remove slugs.

splash basin. But there is water way down in the well beneath and I often wonder how we could get at it for the plants during a drought.

That summer the old concord grapevine began a new life. The spill from hosing houseplants every day and watering with fertilizer every week or so nourished its roots which no longer had to compete with those of the sweet gum. But, more important, sunlight, unhindered by sweet gum leaves, now ripens a large crop of grapes each September.

I was so pleased with the outdoor summering place that I brought all my own houseplants from home. Tropical maidenhair ferns thrived and made you feel cool as they moved in the slightest breeze. Rich silvery-spotted begonias with their tassels of pink flowers varied with the dark red velvet of coleus leaves and the sharp spikes of pineapple set at the southern edge toward the sun.

When watering 30 to 40 plants in

the hot humid days of summer, careful watering practices are necessary. A force-breaker on a long wand at the end of a flexible hose is a must. Putting pebbles around the tops of the pots helps to keep the soil from washing out as you direct the water into the pot and not on the leaves. Mildew forms quickly, especially on begonias. The staff shares in the watering when I am not there, and delights in the cool dappled shade as a place to bring table and chairs out for meals. An old crock is always filled to the brim with fresh water for the dog; it is set among the ferns at the edge, and birds tilt from its rim to drink, but bathe elsewhere. Wyck's guides sit here on "open" afternoons while waiting for visitors. The entrance gates from both Germantown Ave, and Walnut Lane can easily be seen, and the telephone is within earshot.

We now prune only in late February according to grape-growing instructions. As the vine layered itself some years ago there are two or three main trunks up the east side of the arbor, which is latticed. A third new vine has been planted and trained up so that good shade can be had wherever we set the table. Sometimes I climb up the stepladder and cut some of the largest leaves away so that patches of light can come through on my fuchsia and begonia baskets. The southern edge in full sunlight is reserved for lemon and orange trees and the small geraniums and succulents. Big pots of geraniums go elsewhere.

We don't spray the grapevine, though we do spray the houseplants for aphids, mites and mildew. People often ask me why the Japanese beetles haven't reduced the vine leaves to lace. I only say I don't know; perhaps it is a variety they don't like or perhaps there are so many luscious roses at

continued



Some hardy fern, small succulents, and two pineapple plants in front.



Baskets of tripogandra hang from the arbor.



Corner cluster includes begonias, ferns, an orange tree, and geraniums.

Summering the Houseplants continued



Begonia sutherlandii

Wyck they don't bother with the tough grape leaves. Day by day we have to remove the twigs the mocking birds bring at nest building time, and at night by the light of a flashlight we remove slugs. Before color shows on the grapes we spread bird-netting over the top and tuck it in around the edges. If birds fly in underneath to reach the hanging grapes they usually try to escape by flying up towards the light through a hole in the foliage, and become entangled. Their screeches are a warning to all other birds and successfully discourages them.

The houseplants summering under the grapes thrive in the gentle rainfall

and cool patches of shade, the sunlight passing over their airy 10-ft. high leafy covering. The hose is nearby and the crock of water a necessity in which to dunk a forgotten drooping plant for a few bubbling minutes. The grapes reward us all year long as they are made into many pots of jelly and jars of homemade grapejuice.

References for Maintenance of Grape Vines

Modern Fruit Science: Orchard and Small Fruit Culture by Norman Childers, Rutgers University Horticultural Publications, N.J. 1975

All About Growing Fruits and Berries edited for Midwest and Northeast, Ortho Books, Chevron Chemical Co., San Francisco, Cal.

In 1973 Mary Troth Haines left Wyck, 6026 Germantown Ave., to the care of a private foundation wishing it to be preserved for posterity and enjoyed by the public. It had been inhabited since 1690 by nine generations of the Haines family. Jane B. Haines (1869-1937), eighth generation, founded the Pennsylvania School of Horticulture for Women. Because John Swartley, Barbara Emerson and Leonie Bell were connected to PSHW, Mrs. Haines asked them to come to Wyck to advise about the preservation of the garden, which she wanted to leave in good condition. Their suggestion that the Germantown Garden Club might help unearthed the fact that one of its members, Ann Newlin Thompson (Nan), was a tenth generation member of the Haines family. Her volunteer work for six years has been greatly aided by the varied and valuable skills of the above mentioned three persons, as well as various students and graduates of the School. For two years money was granted to Wyck for a gardener's salary from the Pennsylvania Horticultural Society's 150th Anniversary Fund for the Advancement of Horticulture.

Nan lives near Wyck and has known and loved its garden since she was a child. She feels deeply the influence of her great-great grandparents, Jane Bowne Haines and Rueben of the sixth generation. Rueben was one of the founders of PHS in 1827. Notebooks and letters of this horticultural family are being cataloged now. They bring to light many interesting facts and agricultural experiments of the early 19th century (i.e., one notebook labeled "Mistakes" is devoted entirely to listing failing seed plantings in Reuben's attempts to find hardy crops for the northeast USA).

Peppers Pick a Peck of Peppers



My love of peppers (the vegetable, that is) began a couple of years ago at the Pennsylvania Horticultural Society's Harvest Show. Ann and John Swan brought in a basket full of peppers—some were fat and green, others long and tapered and orange, and several were small and red and obviously very hot. The colors were wonderful, the fruits unblemished, and it was hardly surprising that the Swans won several blue ribbons in the 1978 Harvest Show pepper classes.

The Swans' beautiful display of peppers particularly appealed to me. Pepper fruits are so decorative, but I had given up growing the vegetable because I could never figure out how to use even a small portion of the harvest. Each year we grew a few plants and once in a while I tossed a few on top of a salad or into a stew. Gradually my partner in the Pepper vegetable plot became intolerant of this pretty vegetable with restricted culinary use. It limited, he said, his space for growing essentials such as potatoes, carrots and lima beans, which could be stored or frozen for the winter.

If the Swans could produce that many perfect peppers for the Harvest Show, it seemed reasonable to assume that they must have found some way to use the balance of their crop. Before the show closed I had made a date to visit their garden near West Chester.

I arrived early one morning in October and saw a huge basket of peppers in the garage. Inside the house, the gardeners were just finishing a breakfast of sauteed peppers and scrambled eggs. In the storeroom stood rows of jars of red pepper jelly, bottles of sherry peppers, pepper pickles, and in the freezer dozens of little cartons of frozen peppers. The Swans were obviously pepper crazy and before I left, they had agreed



Banana Pepper

to make notes and take photographs throughout the 1979 growing season so we could assemble an article on peppers for *Green Scene*.

selecting pepper varieties

The first big pepper decision in the Swan household comes early in the year when Ann and John order the seeds. As you can see from the photograph, their garden is small, but in 1979 they packed in 56 pepper plants, 13 varieties, along with a wide assortment of other vegetables. About half of these varieties Ann considers "basic." The others are luxuries or new varieties with which they are experimenting.

Among the many pepper varieties on the market, Ann recommends the following:

1. 'Anaheim' TMR23 is what Ann calls a "warm" (as opposed to "hot") pepper. The plants are tall (5 ft.), and seem to prefer cooler weather so the fruits are usually prolific in September.

With this pepper Ann makes a cheese spread (see recipe) or uses it for mild Mexican dishes.

- 2. 'Canape' is their favorite bell pepper because the plant is stocky and prolific and the fruits keep well in wet summers.
- 3. 'Cubanelle' is an early-ripening, prolific sweet Italian-type pepper that Ann uses raw in salads, or sautees for breakfast.
- 4. 'Early Pimento' is "just a joy" because although it is not prolific, the fruit makes superior pimentos which are exceptionally tasty and colorful for winter salads.
- 5. 'Jalapeno' also grows well but is not a prolific producer. The Swans use this variety for jellies and hot foods.
- 6. 'Hungarian Wax' is an easy-togrow, prolific, dependable, hot pepper.
- 7. 'Pepperoncini' produces long thin fruits. The Swans grew this one for the first time in 1979 and plan to grow more next year because the fruits were

continued

Peppers Pick a Pack of Peppers continued



very sweet and wonderful for frying.

- 8. 'Serrano Chile' produces small hot peppers for use in sherry pepper.
- 9. 'Szegedi' produces large red fruits, which Ann treats like pimentos.

Each year the Swans find it harder to select their pepper varieties because, having tried so many, they now have a long list of favorites. They advise new pepper growers to start with those they are most likely to use in the kitchen and branch out gradually each year.

growing the peppers

In the second week of March when the rest of us are working at the Philadelphia Flower and Garden Show, John Swan is down in his basement starting his pepper plants. He uses Jiffy-7 pots and plants three seeds per pot. The pots are put in the furnace room, the warmest section of the basement (70°F). under full spectrum fluorescent lights, which burn 14 hours per day. The pots are covered with polyethylene until the seeds germinate. Germination usually takes 12-16 days. When the seedlings are 2 in. high John thins them to leave the one best seedling per pot. When they are 3 in.-4 in. tall (around the third week of April) he transplants the seedlings to 3 in. plastic pots and waters them with a dilute (1/4 recommended strength) solution of allpurpose fertilizer.

The Swans aim to get the peppers out into the garden by mid-May. During the first two weeks of May they harden the plants off by putting them outside during the day. Hardening off gradually acclimates the tender plants to the harsher outdoor conditions with wide temperature fluctuations, strong sun and winds. Since the Swans grow



Swans' vegetable garden. Peppers are center left.



From left to right: hot pepper jelly, sweet pepper relish, bread and butter pickles, sherry pepper.

about 100 pepper seedlings, this indoor/outdoor shuffle is quite a chore, but Ann considers it essential. Plants that have not been hardened off sometimes never recover from the shock of being transplanted into the garden. By the time they are put out, the plants often have 10-12 flower buds, which produce an early crop.

The Swans' garden is built on a serpentine, rock rubble base and over the years John has improved the soil by adding topsoil and liberal quantities of aged mushroom soil. The garden is divided into six terraces and each year the Swans plant their peppers on differ-

ent terraces to rotate the crops. They also try to separate the hot from the sweet because peppers cross pollinate readily to produce weird fruits with all the wrong flavor characteristics. The taller varieties such as 'Anaheim' are placed so that they will not shade low-growing varieties.

Maximum pepper production is the goal in the Swans' small garden so they only leave 30 in, between rows and 24 in, between plants within a row. At the bottom of each planting hole John mixes half a cup of 5-10-10 fertilizer and around each plant he places a cutworm collar. (John's favorite cutworm



Everything!

collars are made from cottage cheese cartons. For our garden I use green flexible plastic pots such as the ones perennial plants are sold in. From both you remove the bottom of the container to create a 2 in.-3 in. deep collar.)

The Swans have learned that heavilyladen plants often split or lose whole branches in the winds of summer thunderstorms. Sometimes plants simply topple over in the rain-soaked soil. To avoid these potential disasters. John encloses each pepper plant in an 18 in. diameter (5 ft. circumference) wire cage made from 6 in. mesh concrete reinforcing wire. As with tomato cages, it's important to use 6 in. mesh wire so you can reach in to pick the fruit. The reinforcing wire comes in 5 ft. high rolls. From this, John usually makes two cages 2½ ft. high, but the tall peppers such as 'Anaheim' require 5 ft. high cages for good support. When the soil is thoroughly warm, the whole garden is covered with a mulch of salt hay, which not only keeps the soil moist in dry periods and reduces weeds, but also prevents the peppers from becoming mud-splashed in heavy storms.

Over the past 20 years the Swans have had few insect problems with peppers. In 1979, however, the leaves began to curl and drop and they discovered they had a plague of aphids. Malathion seemed the best cure, and the Swans sprayed the plants in the evening after they had picked a batch of fruit. Seven days after spraying, the fruits were again suitable for picking.

One common complaint among pepper growers is poor fruit set. Unfortunately that is due to the rather specific temperatures peppers require to set fruit. Fruit set is poor when night temperatures drop below 60° F or rise

above 70°F. This often means a rush of fruit in early summer and little fruit when temperatures are high. If you keep the soil evenly moist, however, you will get better fruit set in the hot days of mid-summer. Water the plants during dry spells, add a generous cover of mulch (salt hay, grass clippings or shredded leaves for example), and space plants closely to ensure a dense canopy of leaves over the soil.

By mid-July the Swans usually have their first crop of peppers. Most peppers are green in their early stages and turn red as they mature. Some, such as 'Sweet Banana,' start life a yellowish green and turn orange before they finally turn red. To make sure she has plenty of red peppers for canning and freezing, Ann Swan picks only a few of the early peppers in the green stage and leaves the rest to mature and turn red. Since the fruits keep well on the plant, Ann rarely stores them in the refrigerator. Instead she uses them as she needs them, fresh from the plant. At the end of the season she cuts up all the remaining peppers and freezes them in plastic containers. There is, she says, no need to blanch them before freezing. If you have too many small hot peppers, Ann suggests you dry them in plastic onion bags and use for kitchen decoration or thread them on a needle and cord for Christmas wreaths.

cooking with peppers

In addition to my being unadventurous in seeking ways to use our pepper harvest, I had long harbored a misconception about cooking peppers. The misconception arose shortly after I married a Pepper and moved to Philadelphia from Edinburgh, Scotland. Good friends of my husband's welcomed me to my adopted country with a festive dinner complete with peppers. The peppers were delicious, but my friends told me of the hours they had spent charring them under a gas broiler to remove the skins. Since

our stove was electric, I assumed we could not char peppers. Actually I was rather relieved because the charring seemed a lot more complicated than peeling that Scottish staple—potatoes.

Last year I finally learned from Ann Swan how to remove pepper skins (under an electric broiler). As she pointed out, many peppers are, however, usually served with their skins. The thick skins of varieties such as 'Anaheim,' 'Pimento' and 'Szegedi' should be removed.

removing pepper skins

Wait until the 'Pimento' and 'Szegedi' fruits are red. 'Anaheim' is green but mature. Place the peppers on a broiling tray and set the tray 4 in.-5 in. from a preheated broiling element. Keep the door of the oven open. Leave them under the element for about 15 minutes until the exposed side is black and charred, turn them with a pair of tongs and char well on the other sides. Ann says you may have a "few minor explosions" in the oven, but the smell in the kitchen will be wonderfully sweet.

When the peppers are really steaming, pop them into a brown paper bag with a pair of tongs, close the bag for 20 minutes, then empty the fruits into a bowl of cold water. When cooled, remove the skins, all seeds and inside veins. Lay the fruits on a cake rack to drain, and later place them in the freezer on a Teflon tray. Eight hours later you will be able to loosen them quickly and pack them in a plastic bag for compact storage. Pepper juices and fumes can irritate your skin and eyes, so Ann suggests you turn the fan on in the kitchen and wear thin plastic gloves throughout the operation.

Peppers' potted peppers

While the Swans grew 13 pepper varieties in 1979 the Peppers grew 4 varieties, some in the garden, others in pots. 'Sweet Banana' was our most successful variety in both situations,

Peppers Fick a Peckof Pepperscontinued

providing ample supplies of sweet yellow, orange and red fruits. 'Big Bertha' was an unprepossessing new variety of green bell pepper that was obviously unhappy in a pot. 'Dutch Treat,' a new variety, which I chose for pot culture because of its small size, was a disappointment. Each plant produced four or five small peppers on terminal flowers and then sulked for the rest of the summer in both garden and pot.

The results from my 'Anaheim' plants were amusing. I only had room for one plant which I put on our wooden deck in a deep plastic pot (such as you would get at a nursery when you buy a rhododendron). The seedling grew slowly into an ugly plant and narrowly missed being relegated to the compost pile when I noticed it had

spring they moved it back outdoors and got a very early crop.

Peppers offer endless possibilities to the gardener. You can line them up in rows in the vegetable garden, you can grow them in pots or you can nestle them among the annuals and perennials in your flower garden. Their foliage is attractive all through the summer season and the fruits are very decorative. When it comes to harvest time, it's a real joy to deal with a crop that indulges you with such a fantastic array of colors, shapes and sizes-not to mention the variety of uses in the kitchen. On account of my choice of a husband, I am naturally partial to Peppers. After you've tried Ann's recipes and studied John's photographs you may also become a fan.



Ancho

started to set fruit. By the time of the PHS Harvest Show in late September it bore a selection of small, bumpy peppers. Being a novice at this game I assumed this was the way 'Anaheims' were supposed to look. When I compared my 2-in.-long knobby fruits with the smooth 8-in, models produced by the Swans I realized 'Anaheim' was not well suited to pot culture. Ann and John Swan (who won all the pepper classes in the 1979 Harvest Show) were nice enough not to comment on my odd 'Anaheim' plant during the Show. Later I learned that this variety likes lots of root space.

One year the Swans grew 'Serrano Chili' in a pot and enjoyed its fruit throughout the summer. In fall they pruned the plant heavily and moved it inside for the winter. The following

Sources:

Burpee Seed Company, Warminster, PA 19881

Joseph Harris Seed Co., HP-1, Morton Farm, Rochester, NY 14624 George W. Park Seed Co., Inc., Greenwood, SC 29647

Stokes Seeds, Inc., 737 Main Street, Buffalo, NY 14240.

If you want to go wild over peppers, write to Horticultural Enterprises, P.O. Box 34052, Dallas, TX 75234. Their catalog lists 31 varieties with line drawings to illustrate the range of shapes and sizes within the pepper tribe.

Jane Pepper is a public information coordinator for PHS. She writes a weekly column for the *News of Delaware County* and the *Main Line Times*. Pepper received an M.S. in Plant Sciences from the University of Delaware under the sponsorship of the Longwood Program.

ANN SWAN'S RECIPES

Cheese Spread (good way to use up icebox leftovers)

Cut ¼ lb. each Monterey Jack and cheddar cheese as well as 2 oz. of roquefort into 1 in. squares and chop in food processor using steel blade. Add enough medium dry sherry to make a heavy spread. Cut 2-3 fresh or frozen 'Anaheim' peppers (skins, seeds and veins removed) into 1 in. pieces and add to cheese. Blend until smooth and refrigerate in closed crockery pot for at least 24 hours. For variety add a dash of sherry pepper.*

Hot Pepper Jelly

I highly recommend using a food processor (steel blade) — you get more, finer pepper pieces and it is so quick.

1¼ cups pepper pulp with juice

6½ cups white sugar

1¼ cups cider vinegar

6 oz. liquid fruit pectin (2 pouches)

drop of red food coloring if desired

Pepper Pulp Juice

3 large bell peppers, 6 'Jalapeno,' 3 'Hungarian Wax' or as many required to make 1½ cups of pulp. (Do not use 'Cubanelle'; they are too juicy.)

Wash and dry peppers, seed and cut in 1 in. square pieces. Toss in food processor using steel blade. On/ Off motion until chopped. Measure. If you have more than 1½ cups, save and make another batch later.

Put pepper pulp in kettle with sugar and vinegar. Bring the mixture to a rolling boil and add all of the pectin. Return mixture to a rolling boil and cook, stirring constantly, for one minute. Skim off foam and add food coloring. Pour jelly into hot sterilized glasses and cover according to directions. Cool jars out of draft before moving. Yield is six or seven half pints.

Serve with cold meats or with crackers and cream cheese. Also great with roast lamb, or curry. A new use—a friend makes an omelet and puts a dollop in the middle and rolls it up.

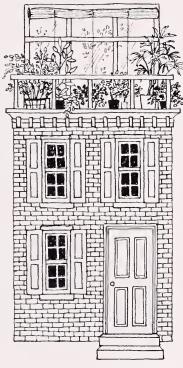
*If you are interested in recipes for sherry pepper, pimentos, pepper relish, ramekin peppers and chili casserole ('Anaheim' peppers) send 40 cents and a selfaddressed stamped envelope to Mary Elizabeth Lee, Green Scene, PHS, 325 Walnut Street, Philadelphia, PA 19106

Three Scons Lening Three Scons Lening Sound Line Scons Lening Sound Line Bonham

From my greenhouse, I stare out at the second story roof deck on top of my center city rowhouse. It glistens with the February rain. I see the wet, grey-brown cedar flooring and the weathered pine planter boxes with remnants of last year's plants. Rusty metal cans with bare stakes hold nothing right now. Dark grey cinder blocks that served as containers, risers and plant stands border a rather unkempt pile of empty clay and plastic pots. Two orange milk crates are the only spot of color. Against a background of brick and stucco buildings is the view of my garden in midwinter. What a contrast to the kaleidoscopic colors and lush green foliage that I saw there last summer.

It had been awhile since my last outdoor gardening venture. I had lived in my yardless house for almost two years before the roof deck was completed. It was my first full-sun garden (after several seasons of a full-shaded backyard garden in Chestnut Hill). And it was also my first major effort at outdoor container gardening. This garden presented me with several new challenges. The results were very satisfying; between September and the placing of the first planter box in May, I learned a lot about gardening three stories up.

I chose to develop an annual garden—flowers, foliage plants, and vegetables—for several reasons. I craved lots of color. I had not myself recovered from being transplanted from a verdant environment to a soot-stained stucco and brick one. An annual garden seemed easy to plan and develop. I was working on the construction of my greenhouse, too, and the purchase of annuals and gathering suitable containers was not terribly time-consuming. It also was a relatively inexpensive first garden, costing about \$150 for plants, soil, and some containers. (I used as



many "recycled" containers as possible; while they lowered the cost of the garden, they introduced other problems later.) I was reluctant to invest in more expensive hardy material and elaborate containers until I had experimented a bit with this virgin site.

The deck is 22 ft. by 14 ft. and since my house sits on the corner of the block, the eastern and southern sides of the deck are open. Along the west side is the stuccoed third story wall of my neighbor's house, which I at first assumed to be a liability to the garden because its shadow begins to creep across the deck by mid-afternoon. The garden room borders the north side of the deck.

I can't give you a detailed plan of the garden since I rearranged it a few times over a five-month period. (I soon learned to appreciate that unique aspect of a container garden: you can move plants around to accommodate them and yourself.) Basically, ten pine window boxes lined the exposed perimeters, some tiered two high. Leftover cinder blocks from the garden room construction served as containers themselves or supports for potted plants along the edges also. On the southern half of the deck, the center was a display area for individually potted specimens supported by crates, cinder blocks, and inverted pots of different heights. In midsummer, I placed a 10-ft. planter box along the base of the party wall.

the plants

Using color, texture and growth habit as criteria, I created several minigardens, First, I disassembled five flats of annuals that included three varieties each of geraniums and petunias, two each of alyssum, lobelia and begonias, four varieties of coleus, a vinca, impatiens, nicotiana, torenia, ageratum and lantana, all common annuals. I planted lemon thyme, purple basil, curly parsley, allium, artemisia and a few scented geraniums. I also potted up individual vegetable plants-tomatoes, peppers, eggplants, brussels sprouts. Bush squash, cucumbers, radishes and lettuce rapidly filled the 10-ft, planter box after a midsummer sowing. Two clumps of sempervivum highlighted a desert planting. Oh, yes, and eight fuchsia comprised a hanging basket along the wall with wandering jew and swedish ivy. In addition, I acquired a number of cacti and succulent specimens, a group of house plants I am fond of and for which I have never had sufficient sunlight. I staged them in the center arouping.

It was, truthfully, a boatload of plant material. In my zeal to create an instant garden, I forgot that annual plants grow rapidly and get fat, and I disobeyed a gardener's axiom, "Thou shalt not plant too closely." In terra

Gardening Three Stories Up: continued

firma, plants have the option to spread out somewhere; in a planter box they do not. And while lobelia, petunias, and alyssum deserve to spill over the sides of their containers to show off their habit and color, overcrowding stifles flower production because they shade each other. Hence, the larger containers of multiple plantings required not only the regular midseason cutback of annuals to stimulate a strong second-half performance, but during two major operations, I had to pull out almost half of the plants to give the rest a break. I learned the hard way the definition of the term "weed."

When I finally corrected the over-

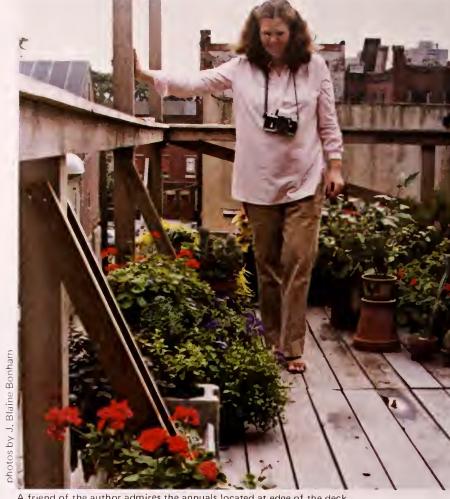
I learned quickly, however, that dinner guests, primed with a cup of coffee, can be persuaded to work for their meal by "just doing a bed or two."

crowding, how those plants rewarded me with continuous masses of color. Of course, the sheer numbers of annuals means a lot more maintenance. Deadheading became as regular a routine for me as shaving. The punishment for neglecting this task was a halt in flower production, I learned quickly, however, that dinner guests, primed with a cup of coffee, can be persuaded to work for their meal by "just doing a bed or two."

The annual garden was high maintenance gardening, wonderful therapy when I needed it, and a drag when I was too busy, tired, or hot. This year's garden will have other kinds of plant material in it. The experience, however, was valuable, since I learned much about the dynamics of container roof gardening.

microclimates

I discovered three microclimates in my small garden. In the diagram below, microclimate #1 was exposed to constant winds and the greatest amount of afternoon sun, thus completely drying out the containers there daily. The geraniums thrived, naturally. So did the herbs. And, surprisingly, ordinary pink



A friend of the author admires the annuals located at edge of the deck.

waxed begonia with green foliage bronzed to a beautiful red in full sun, stayed compact, flowered profusely and didn't seem to mind their commanding position at the corner of the deck at all. None of the other plants were crazy about the wind, though. The coleus drooped daily, lobelia stopped flowering, and the ageratum surrendered.

Microclimate #2 received lots of sun; however, the corner of the west wall reduced some of the wind currents. and the plants in the center of the deck tended not to dry out as quickly.

The wind had an interesting effect on the vegetable plants. Situated at Point A to receive maximum sun, tomato, eggplant, pepper, and brussels sprout plants stayed smaller than the same or similar varieties containergrown in a more protected area, though the size of the fruits was unaffected. Possibly the daily drying out they received slowed their rate of growth. Fruit production on the tomatoes was very low; the blossoms often fell off before pollination. The numbers of pepper and eggplant fruits were high. however, evidently attesting to the usefulness of the wind as a pollinator.

Microclimate #3 held some surprises for me. My neighbor's wall begins to shade the deck after two o'clock, and I thought that it would provide a "short day" for plants in that area. And it did protect coleus, lettuce, torenia, and wandering jew from afternoon sun. However, that wall caught the first rays of light around 8:00 in the morning and the light tan stucco wall reflected light onto the deck. Saladin hybrid cucumbers, listed as 55 days to picking, climbed up a nylon netting against the wall and produced ediblesized fruit in 45 days. St. Pat scallop

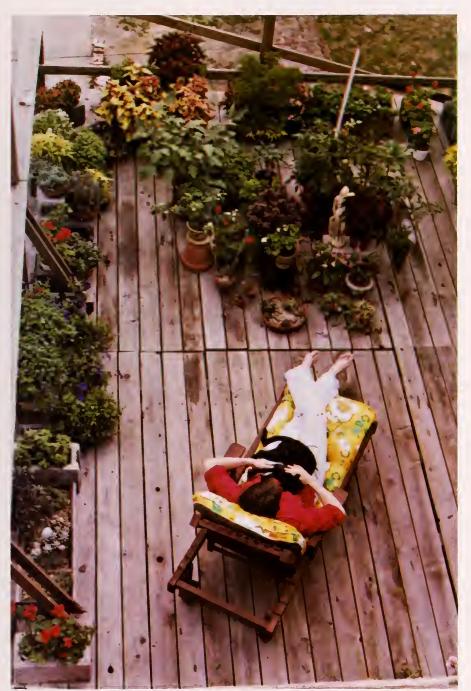


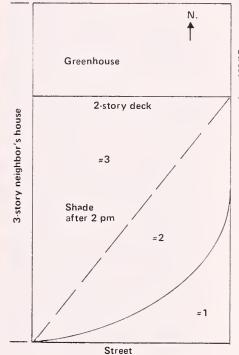
Photo taken from peak of the greenhouse. The center display section features eggplants, peppers, tomatoes and various specimen plants.

squash bore two inch fruit in 45 days (they usually require 50 days to fruit). The brussels sprout plants along the wall grew larger than their counterpart in the middle of the deck. Moreover, these plants could wait two days between watering.

The successful combinations of containers and soil mixes were, of course, interrelated to these microclimates.

The moisture-retentive qualities of various materials used as containers are accentuated on a hot, dry, windy roof. As expected, plants in the non-porous hard and soft plastic containers dried

out less quickly, and I compromised my aesthetic distaste for these containers to alleviate the drying-out problem. The pine boxes ranked second in retaining moisture. Wet wood swells and helps to retard evaporation; also these containers held a larger volume of soil, and that contributes to slower water loss. Unglazed clay containers afforded little water retention, while the highly porous cinder blocks turned with the holes up and filled with soil and plants fared very poorly, drying out in just a few hours. If I use them again, I will glaze them with poly-



continued

Gardening Three Stories Up: continued



In the afternoon the party wall shades the planter box at its base. Lettuce, cucumbers and St. Pat's scallop squash. In front brussels sprouts and coleus.

urethane to help keep in moisture.

Some city dwellers are trash-pickers by nature (those people you see rummaging in someone's discards aren't all vagrants). I hauled home two metal vegetable oil cans from a health food store trash pile to use as containers for vegetables. In effect what I did was to place the plants in ten gallon sauce pans that thoroughly cooked the roots and soil on hot sunny days, while on rainy days, the containers got a bit soupy despite the drainage holes. They rusted to a nice color anyway. And I may still be able to use them in a shadier part of the garden, with a lighter soil mix and additional drainage holes.

Generally, I used too much sand in my soil mix. The basic recipe was \% potting or topsoil, ¼ peat moss, ¼ perlite (sometimes I used vermiculite), and ¼ sand. I did vary the combination to suit the requirements of certain plants. But almost everything dried out too fast, except the herbs and geraniums. At least in the sunniest, windiest locations, I will use a more humusy soil mix this year. When I installed the 10 ft. planter box along the west wall in midsummer, I tried to correct this situation by using almost no sand. I admit to the folly of my conclusion, since the box is shaded most of the afternoon. It took several days to dry out, and I finally incorporated a little sand into the soil after a few sowings of seeds had floated off to the edge of

the container. That container promptly became an excellent bed for vegetables.

I was surprised to discover the low incidence of insects in my garden. Maybe they just don't like heights. I carefully inspected any new additions to the garden for evidence of their presence. The constant daily hosing kept the major problem, white fly, to a minimum. I added a few treatments of Pratt's white fly spray on the ornamentals and an Ortho All Purpose insect spray for vegetables: Tomato and Vegetable Insect Spray (containing colenone and pyrethrins).

In spite of all the growing pains, I enjoyed the effort immensely. As I look at my hibernating garden and plan for spring, I know it won't be comprised of all annuals. Oh, there will still be some, because I like the colors so. A permanent herb garden is on the drawing board, along with the addition of some hardy plant material—a few evergreens, a small tree. How will they fare with the drying winds? How can I best insulate the pots in the winter? I hope to report my findings to these and other questions next winter.

J. Blaine Bonham is director of the Philadelphia Green project.

the plantfinder - A new service for Green Scene readers

If you have been unsuccessfully searching through the usual sources for a particular plant or specific seeds, let us know. We will publish a "want list" in each issue. Send your name and address (include zip), the botanical name of the plant and if you wish, the common name. Send to Plant Finder, Green Scene, PHS, 325 Walnut St., Philadelphia, PA 19106. People who have the plants or seeds you want will contact you to make arrangements about selling or giving them away, mailing, etc.

WANTED

Seeds for the vine Ampelopsis brevipedunculata (porcelain ampelonsis)

Contact: Mrs. Bryce Douglas, Box 235, Kimberton, PA 19442.

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Seeds or plants: Restio subverticillatus (rope grass); Tropaeolum polyphyllum; Tussilago farfara variegata (variegated coltsfoot); Hemerocallis altissima.

Contact: H. Peter Loewer, Cochecton Center, New York, NY 12727.

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Seed: Lynchnis coronaria 'Alba' (white flowered form)

Division: Romneya coulteri: would like to know if anyone is successfully growing this in this area.

Seed: Argemone grandiflora

Contact: Barbara Bruno, Henry Ave., R.D. 6, Bridgeton, NJ 08302.

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Rhododendrons (hybrids) with creamy or yellow flowers. 'Unique' is the only one we have been able to locate.

Contact: Mrs. Charles M. Carr, Village Road, New Vernon, NJ

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Seed or plants of Welwitschia, Argy-

roxphium, and Cephalotus. I am also interested in exchanging plants/cuttings of unusual succulents, especially Caudiciforms.

Contact: Steven P. Silberstein, Gatewood Apartments No. 221, Cornwells Heights, PA 19020.

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Source for *Ribes* (black currant) for Colonial Plantation in Chester County.

Contact: Evelyn Hett, 425 Alliston Road, Springfield, Pa. 19064.

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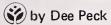
Bushy plant (Datura inoxa)
Contact: Candy Curry, 132 E. Haddon Ave., Oaklyn, NJ 08107

To our readers: We've already gone to press for the July issue. Our normal lead time for publications is three months. We must have copy for the September issue by June 15.

Getting Started with Primroses



Primula sieboldii (Cortusoides)



The primula is probably one of the best known plants throughout the world, and yet the average gardener is barely acquainted with even the commonest kinds. Somehow they have acquired the reputation for being exotic and consequently very difficult to grow. Some of the loveliest are exotic and impossible to grow away from their native terrain, many others can be grown by the expert gardener, and a generous number will flourish even under the hand of the beginner. In this article I'll deal with the last category and a sprinkling of the more difficult for those who relish a challenge.

Most of the 400 or so species of primroses are hardy perennials and are scattered extensively throughout all parts of Europe, Asia and North America. Oddly, only one species is found below the equator—Primula magellanica of South America. Probably the greatest number are native to Asia and were introduced to the western world by plant explorers of the last century such as Reginald J. Farrer and Francis Kingdon-Ward.

Primulas are classified into 30 sections based on botanical characteristics such as direction of leaf edge curl, the presence or absence of petioles (leaf stems) and whether or not the plants possess "farina," a silver or gold colored meal present on the leaves, stems, and sometimes blossoms. The species we will consider here fall into only six

sections: Auricula, Candelabra, Denticulata, Vernales, Cortusoides and Farinosa. I've divided them according to where they grow best and put them in the order in which they appear in spring.

With few exceptions, primroses share the same cultural needs: a rich humusy soil, good drainage, ever present moisture, and moderate amounts of light—the need for each depending upon the degree of the others. For example, if your primroses are in shade, moisture requirements are lower than if they are in the sun for part of the day. If your soil is sandy and fast draining, watering must be frequent—more so than if your soil is a humusy loam. Fortunately all these factors can be modified.

denticulata

The name Primula springs from the Latin word "primus," or "first," signifying the plants' early appearance. The very first to appear in our area is Primula denticulata, close on the heels of the last snow, and occasionally caught by it. In mid-March, this primrose emerges from swelling rosy buds that remained barely visible when the foliage of the previous summer died down. A sphere of blossoms opens even before the stem elongates. The leaves expand as the stem rises slowly, usually to about 10 in. in height. The bloom period is three weeks, and bloom color is usually pale lavender. However, forms are available in pure white, purple,

pink, and red—all with a white eye. Self-sowing is common, and it is a good idea to pull and discard plants of an unattractive color before they seed.

Desirable colors can be easily divided after flowering in the following manner: Carefully lift the clump, shake gently to remove soil, and carefully separate the crowns. Trim the roots of each division lightly, remove dead leaves and spent blossoms, shorten the leaves by about one half, and replant in rich, well-drained soil. Make sure the crown is at soil level and carefully spread the roots, firming the soil about them. Watering with diluted liquid fertilizer at this time will help counteract the shock of transplanting. Take care that the divisions never dry out. Water religiously until established, and shade if necessary. This method of division can be used for most primroses and will increase choice colors rapidly.

Although it is one of the easiest primroses to grow, it is important that the planting area of Primula denticulata be well-drained in winter. The plant has rather heavy, thong-like roots which, along with the crown, will rot in standing water. It does better in a shaded position but will tolerate more sun if planted near a large rock for shade and a cool root run. A stone mulch is also excellent. It promotes drainage, cools the soil and conserves moisture, Primula denticulata is not pretty when bloom is over. The foliage has enlarged to foot-long cabbagelike leaves and the tall stems are topped by untidy seed heads. An attractive solution is an interplanting of deciduous ferns. The uncurling fronds appear after the flowers of the primroses are gone. This same camouflage can be used with other early flowering primroses.

continued

Primula denticulata cashmeriana is a good reddish-lavender form of P. denticulata offered by many nurseries. It is shorter (four to six inches) with beautiful silver farina on buds and stems.

farinosa

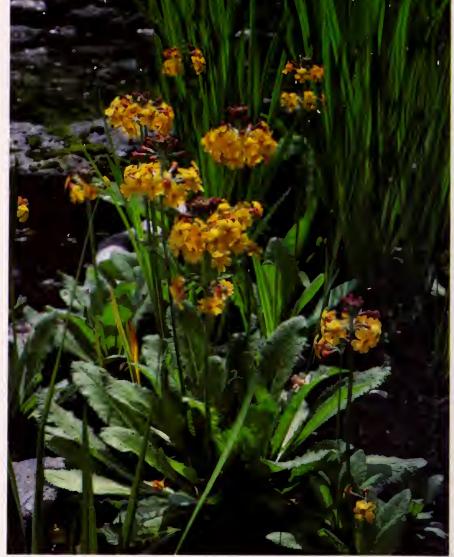
From late March to early April the "bird's eye" or farinosa primroses appear. The type, Primula farinosa, is a tiny three-inch lilac-pink beauty covered with silvery meal. Primula frondosa is almost identical, but somewhat larger. Primula rosea is a glamorous cousin quite small, and a glowing rosy pink. It needs more moisture and thrives near running water. Primula modesta is a Japanese relative, very similar, except that it is covered with gold meal rather than silver. All have a white or yellow eye, the reason for the common name. The last two are somewhat difficult, but P. farinosa and P. frondosa are well worth trying. They want the same culture as P. denticulata, and especially love the gritty, humusy mulch.

vernales

The vernal primroses arrive at the height of spring. They are the ones most of us know and are the easiest of all to grow. The true "primrose" is the wild primrose native to the British Isles, *Primula vulgaris*. Its pale yellow blossoms are borne singly on short stems that rise just above the foliage. Crosses with its Turkish counterpart, the pink to purple *P. sibthorpii*, have yielded hybrids in an endless array of colors—pink, rose, pale blue, red, white, orange, bronze and deep velvety purple. These hybrids are properly known as *P. acaulis*.

Two other British natives, the cowslip, *P. veris*, and the oxlip, *P. elatior*, are very easy to grow in the Delaware Valley. They are not flashy beauties but have a quiet charm and are of special interest because they, crossed with *P. vulgaris* (or *P. acaulis*), are thought to be the progenitors of the fantastic hybrid polyanthus primroses.

The polyanthus primrose (*Primula* x *polyantha*) is a hybridizing triumph. It exists in every color, some brash and brilliant, some pale and subtle, some so deep a purple as to be almost black. All carry a cluster of blossoms on a sixto eight-inch stalk. There are many forms, from charming miniatures to



Primula x bullesiana (Candelabra)

giants with sturdy stems and massive flowers. There is 'Jack-in-the-Green,' an old form with a green ruffled collar about each blossom. Some are hose-in-hose, some double. Other lovely old forms are the gold- and silver-laced polyanthus—dark, dark colors neatly edged in gold or silver. New hybrids keep coming from Japan and the Pacific northwest.

The last vernal primroses I want to mention are *Primula juliae* and the *P*. x *juliana* hybrids. *Primula juliae* is a low plant with tiny half- to three-quarter inch kidney- or heart-shaped leaves and luminous wine red blossoms carried singly on short red stems. It spreads into two-inch high mats by means of a creeping rootstock rather than multiple crowns. A striking effect can be achieved by interplanting *P. juliae* with bulbs of chionodoxa, scilla, grape hyacinths or early flowering miniature pale yellow daffodils.

Crossed with *Primula vulgaris* or acaulis, *Primula juliae* has produced

the hybrid line of *Primula* x *juliana*. The best forms have the small size of *P. juliae* and have acquired the best *P. acaulis* colors. Some have single blossoms and some have umbellate clusters. Among the best are: Wanda,' crimsonmagenta; 'Pam,' brilliant red; 'Jewel,' crimson; 'Schneekissen,' white; and 'Marguerite,' yellow.

The vernal primula, unlike the deciduous denticulata and farinosa, retains its foliage throughout the summer and even into the winter. Watering is very important as red spider can disfigure the leaves and the plant is weakened in conditions of drought. For the same reason, partial shade and rich moisture retaining soil are essential. If grown under sunnier conditions, as much humus as possible should be incorporated into the soil. Vernal primroses multiply rapidly and should be divided every two or three years, in the same way as the denticulata. The hard center portion of each clump should be discarded.

auricula

While all this activity has been going on in the woodland and its borders, in the rock garden the auriculas have been coming into their own. The distinguishing characteristics of the auriculas are their thick succulent leaves and heavy stems. These qualities tell us that they have adapted to drier, more open conditions than their thinleaved relatives are used to. It also points out the importance of rapid drainage to prevent rotting of the crown and indicates that ideal planting spots would be on scree-like slopes, between rocks, or in dry walls. It does not mean, however, that the roots should ever be permitted to dry out. A constant supply of moisture is still necessary. Fortunately the auriculas are able to send their long tap-roots deep into cracks and crevices in search of water.

The two groups of auriculas that can be grown out of doors are the European mountain or alpine auriculas, and the garden auriculas. A third group, "show" auriculas, are a highly hybridized group of pampered beauties

grown only in glass houses where the weather can never mar their blooms. The wild mountain or alpine species and their hybrids are an extensive group and are indeed lovely. They are by no means impossible to grow, but tricky

In my opinion, the perfect complement to primroses are the ferns. The evergreen polypodys and delicate spleenworts can clamber over the rocks and peer from crevices near the auriculas. The damp-loving osmundas and the ostrich fern are perfect neighbors for *Primula japonica*, and the beautiful maidenhair fern graciously fills in as the denticulatas pass their prime.



enough that they do not fall within the limits of this article. As your expertise increases, however, do try some.

They are somewhat difficult to find, but many can be obtained from nurseries selling alpine plants. Others can be grown from seed, available through the American Primula Society and American Rock Garden Society seed lists. A few worth trying are: Primula auricula v albo-cincta, P. rubra (also called P. hirsuta), P. x pubescens, and P. marginata.

The garden auriculas are similar to, but larger than, the alpine auriculas. Through hybridizing, the color range has been expanded from the original yellow and lavender colors, into odd and interesting shades including brown, mahogany, maroon, crimson and grey. They usually are found in catalogs simply as *Primula auricula*. The heavy foliage lasts all season and well into the winter.

Their culture is identical to the alpine auricula, but they are tougher and easier. Choose a site as described for the mountain species, and plant in a good, gritty soil. Then cover the surface with a thick stone-chip or gravel mulch and partially shade the plants with large rocks if natural shade is absent. They can be divided after flowering just like the other primroses, but often the roots are scanty and it is wise to treat such divisions as cuttings until more roots develop. A special cutting bed with a plastic covered frame is useful for this. Place it in a bright, but shaded area and take care that it is not too moist or the crowns will rot. Just barely moist at the roots and humid around the foliage is the key to success.

cortusoides

Appearing just a little later than the vernal primroses, but very similar in their cultural needs are the Japanese woodland primroses, members of the cortusoid section. The one most commonly grown is Primula sieboldii. This is a relatively easy and long lasting primrose that grows into clumps of scalloped oval leaves. Its underground rhizomes creep beneath the lightly shaded forest floor, forming three-inch high mats. The umbels of large one- to two-inch flowers rise well above the foliage. The type species is magentarose. Pinks, reds, and a pure white are available, however; all have notched



Primula auricula (Auricula)

Getting Started with Primroses continued

petals, some deeply cut, lacy and frilled —truly beautiful.

After flowering, the foliage dies and disappears. The rhizomes can then be easily lifted and divided—but need not be so often as other primroses. Because of its early dormancy and late spring appearance, it is a good idea to carefully mark the patches so you won't forget where they are and inadvertently dig into them.

Another lovely cortusoid primrose is Primula kisoana. It has tuffets of geranium-like leaves covered with white fuzz, surmounted by three to five rose colored blossoms. The leaves are not completely expanded until after flowering. It spreads by underground stolons-new baby plants appearing as much as a foot away from the parent. When a good root system has formed on the offsets, they can be severed and transplanted into well-prepared soil. If the situation is to its liking, this primrose becomes a veritable ground cover. It can also be grown in the rock garden if partially shaded and well mulched with rock chips.

As mentioned earlier, the culture of the cortusoides is identical to that of the vernal primroses except that they are heavy feeders. Therefore, whenever dividing and replanting, a well-enriched soil is a necessity. If not dividing, an application of 0-10-10 early in the fall will be good for the plants—hardening them and sending them into a healthy dormancy for winter. Nitrogen at this time leads to soft, tender growth that will not survive winter's blasts.

candelabra

The last primroses to be considered here are the candelabra. The members of this group are moisture lovers and thrive at bog's edge and pond-side. Primula japonica is the typical candelabra primrose and the one most often grown. It is quite tall and large leaved, commonly attaining a height of two feet. It will carry as many as six tiers of blossoms, the first tier opening close to the newly expanding leaves. As the stem elongates, succeeding whorls of bloom open for about three weeks, illuminating the transition of spring into summer. When fully open, the leafy clump is as much as a foot across, the foliage long and toothed. P. japonica prefers shade, but with adequate moisture at the roots will tolerate a sunnier spot—even the perennial border. The colors range from wine, through rose and pink, to white. As with *P. denticulata*, they come easily from seed and self-sow freely. By culling the poorly-colored seedlings, one can obtain quantities of good color selections with little initial outlay. Some of the excellent named cultivars

The polyanthus primrose (Primula x polyantha) is a hybridizing triumph. It exists in every color, some brash and brilliant, some pale and subtle, some so deep a purple as to be almost black.

obtainable as plants are 'Glowing Embers,' 'Miller's Crimson,' 'Alba,' 'Pink Lady,' and 'Rosea.' Because they are so prolific it is easy, when one has space, to have them in great drifts. When grown this way they truly light up the pond, stream-side or woods that is their home.

Candelabras go completely dormant in fall, retaining no leaves to mark their location through the winter, and since they resume growth very late in spring, one must be careful to mark or remember their location—and not despair of their reappearance.

Other candelabras that the more skillful grower might try are *Primula beesiana* (which appears just after *P. japonica*), *Primula bulleyana*, and the hybrid of the two, *Primula x bullesiana*. Another to try is *Primula pulverulenta*. The Bartley strain combines blossoms of lovely pink with silvery-meal covered stems. *Primula cockburniana* is the smallest candelabra, having only two tiers, but the cultivar 'Red Hugh' has the nearest to true red blossom of any of the primroses.

growing from seed

Having been captivated by primroses, and wanting to try a large variety not easily obtainable, growing them from seed is the next logical step. Here is a simple method that works:

Gather together in your work area the following materials: a very fine sterile planting medium such as Jiffy-Mix, mixed 3:1 with sharp builder's sand; coarse grit or fine gravel for covering the seeds; some paper towelling cut to fit the bottom of your pots; labels and containers (I prefer square

21/2-3 in. plastic pots).

Place a small square of paper towelling in the bottom of the pot to prevent the medium from washing through the drainage hole. By the time the towelling deteriorates, the medium will have consolidated and will stay put. Fill the pot to the brim with the planting mixture and firm it gently but thoroughly with the bottom of a second pot to about one-half inch below the pot rim. Add more medium if necessary.

Until now your seeds should have been in the refrigerator, secure in a jar with a tight lid. From the envelope, or a folded paper, tap the seeds gently onto the surface of the medium—not too thickly. Try to keep them wellspaced (about one-eighth to one-quarter inch apart). Now cover the entire surface with a thin one-eighth inch layer of the coarse grit or fine stone chips. Label with the plant name, date, and any other pertinent information.

Water from below until the surface of the medium is obviously moist. If the medium sinks drastically into the pot you didn't firm it enough.

Place pots securely in a well-drained flat and place the flat in a spot outside where it can remain all winter. Cover flats with an old window screen to break the force of rain and exclude marauding mice and birds. Winter rain and snow should take care of your watering problems, but watch the weather and check if necessary.

Start looking for seedlings when the temperature has been at 50° for a couple of weeks. When they appear, place flats in bright shade, keep moist but not soggy, and continue protection with screen. Seedlings are ready to transplant as soon as they are large enough to handle (usually when first true leaves have appeared). A planting medium consisting of 50% Jiffy-Mix, 25% sand, and 25% garden loam (or a comparable mixture) should be used at this stage. The loam helps retain the fertilizer in the mix, thus reducing frequent fertilizing.

Use 2½ in. pots, or standard flats, filled with the above mix and gently firmed. Again use paper towelling squares in the pots—or a sheet of newspaper in flats—to hold the medium in. Prick out seedlings and set to just below the first set of leaves—one per

CHOOSING PRIMULAS TO GROW IN THE DELAWARE VALLEY Ease of Ease of Foliage Color Range Name Foliage Bloom Color Range Culture Culture Section Cortusoides Section Denticulata 2 d pale lavender 3 P kisoana d m. to l. rose P. denticulata е 3 3 P. d. cashmeriana d е red-lavender P. sieboldii d m. to I. magenta-rose P. d. selected forms white, purple, 3 P. sieboldii hybrids m. to I. white, rose-red, 3 d е М pink, red lavender, pink Section Farinosa Section Candelabra P. farinosa d е lilac-pink 2 P. beesiana d magenta to 3 P. frondosa 3 d е lilac-pink rose-carmine pink, white P. modesta d е P. x bullesiana d yellow, copper, 3 P. rosea rose-pink d е orange-red 3 P. bulleyana d orange-yellow Section Vernales P. cockburniana copper-orange d P. c. 'Red Hugh' P. acaulis * * m all colors 4 almost true red 1 р P. heladoxa P. elatior vellow 4 d vellow 1 p m P. juliae* wine-red 4 P. japonica crimson wine, 4 m p pink, white P. x juliana р m all colors 4 P. x polyantha * ** P. pulverulenta d best forms 3 all colors. m p wine-red some gold or P. p. 'Bartley Strain' d pink with 3 silver-edaed silver stems 4 P. sibthorpii m pink to purple р 4 P. veris m vellow р P. vulgaris pale yellow 4 **KEY** *available, but hard to find, as 'Jack-in-the-Green' and hose-in-hose Foliage **available with double blossoms d = deciduous Ease of Culture p = persistent 4 = easiest of all (can't fail) Section Auricula 3 = quite easy **Bloom** period P. auricula hybrids yellow, brown, m 2 = less easy e = early (mid-March to early April) (garden auriculas) lavender, grey, m = mid-spring (mid-April to late April) 1 = least easy mah ogany, ma-I = late spring (late April through May) roon, crimson

pot and one to two inches apart in flats. Water from below, drain well, and place beneath screens in the shade until established, at which time screens can be removed. Keep well watered and fertilize with soluble fertilizer at least once during the summer.

Plant the young primroses out in a prepared area at least two months before expected frost to allow plenty of root development before winter. This will help prevent heaving. A light mulch of evergreen boughs after the ground has frozen also helps. Auriculas may not be large enough to plant out the first year and should spend the winter in a cold frame or in an area protected from excessive moisture.

have nothing to do with the plants

The late Doretta Klaber, that marvelous grower and writer, has written: "Beware! I warn you! Primroses cast a spell. The only way to avoid it is to have nothing to do with the plants. Once you start to grow primroses you are lost. You want more and more,

earlier and later kinds, more varieties, more species, more colors. You start with a few plants. You are entranced. Soon your little patch spreads. You divide your plants because you want pools of one color. You raise primroses from seed to have them by the hundreds. A corner at the edge of the woods soon becomes . . . a Primrose Path. The path grows, new paths branch off. Primroses are insidious, they are devastating—growing them becomes a habit. And few things can possibly give you so much pleasure in both anticipation and fulfillment."

Sources for Primula Plants and Seeds

Bluestone Perennials, Inc., 7211 Middle Ridge Rd., Madison, Ohio 44057. Excellent prices on liners (6 packs of small plants) of *P. x polyantha*, *P. vulgaris*, *P. japonica*, *P. denticulata cashmeriana*, and garden auriculas.

Far North Gardens, 15621 Auburndale Ave., Livonia, Michigan 48154. Plants of *choice* hybrid *P. acaulis, P. x polyantha, P. x juliana,* and *P. sieboldii*. Also seed of the foregoing and of show auriculas, hybrid garden auriculas, *P. denticula, P. japonica* and numerous species difficult to obtain anywhere but through plant society seed

exchanges

Geo. W. Park Seed Co. Inc., Greenwood, SC 29647. Seed of *P. acaulis, P. x juliana,* and *P. x polyantha*.

The Rock Garden, Rt. 2, Litchfield, Maine 04350. Plants of all common and many hard-to-find kinds in all sections mentioned in article (and more).

The Wayside Gardens Co., Hodges, SC 29695. Plants of *P. vulgaris*, *P. x polyantha* and *P. x juliana*.

Plant Societies:

American Primrose Society, Doretta Klaber Chapter. Dues, \$3.00 per year, to William Siegel (sec'y-treas.), 3024 Runnymede Dr., Norristown, Pa. 19401. Two meetings per year at present; spring plant show; fall plant sale (members only).

American Primrose Society (national). Dues \$7.00 per year, to G. K. Fenderson, Sec., Grout Hill, S. Acworth, N.H. 03607. Quarterly publication, cultural chart, and seed exchange.

Dee Peck is a graduate of the Arboretum of the Barnes Foundation and is at present a horticultural student at Temple University, Ambler Campus. She hopes to do more freelance writing and lecturing when her studies are completed. She is active in the Delaware Valley Rock Garden Society, the Philadelphia Indoor Light Gardening Society and the Delaware Valley Fern Society.



November crop. Left to right: escarole, broccoli, beets, brussels sprouts, swiss chard and celery.

The Appeal of Eel Grass as a Mulch

by Carolyn Aquino Berger

While I watched from my kitchen window one day a robin swooped down into the vegetable garden. A few moments later it flew away, trailing a ribbon of black in its beak. The ribbon was, in fact, a piece of eel grass being used as a mulch in my garden. What a cycle the robin was completing. For me the story began 12 years ago.

In the summer of 1967, my husband and I spent time in Galway, Ireland. There I learned that the people of the Aran Islands used seaweed to improve their soil, which was barren. Several years later, while enrolled in the horticulture program at Temple University, Ambler Campus, I came across a brief

mention of the use of seaweed for compost as well as mulch. Checking further, I found that some homeowners at the Jersey shore did use seaweed. In addition to adding organic matter and holding moisture, the seaweed seemed to offer rose plants, for example, protection against certain diseases and insects.

My husband and I decided to use seaweed in our vegetable garden. The type most readily available on Long Beach Island was eel grass. It is really a variety of *Vallisneria* (Hydrocharitaceae or frogbit family). There are 8 to 10 species of *Vallisneria*, commonly known as wild celery, tape grass or water



celery. Botanically seaweeds are algae. Eel grass is a submerged grass.

The Department of Agriculture presents it as an excellent plant around the margins of lakes, rivers or ponds, because fish use it as a protective spawning area. Portions of the plant are eaten by waterfowl and used in nesting. It attracts marsh birds, wildfowl, shore birds and small animals. Eel grass lies on the bay side of Long Beach Island in rippling waves of black, having been carried to the shore by the gentle bay tides.

About seven years ago we began to bring back to our Philadelphia garden eight to twelve large plastic trashbags of eel grass per year. We hose it down, to wash away any salts. Then we spread it between the rows of vegetable plants. Broccoli was the first to receive this treatment. The leaves turned a very dark green. And we had no buggy infestations. Our kale plants fared as well—no bugs.

Weeds do not germinate through this layer of mulch. We've reduced our slug population substantially. I periodically inspect for them under the eel grass blanket.

Aesthetically it is most attractive. Its color, fresh from the shore, is a dark, sooty charcoal grey. With the summer sun, it bleaches out before breaking up and decomposing.

The texture of our soil has changed.



Author collects eel grass at Harvey Cedars on Long Beach Island (N.J.).

It is loamy and friable. This is the first year I did not turn over my garden. I took a hoe and made rows, just pushing aside last year's eel grass. We calculate that we have applied about one pound of eel grass on every square foot of our 24 ft. x 24 ft. vegetable garden.

This past season, with its pelting downpours, has proven the value of eel grass. Several times I fully expected the seeds would be completely washed out. The 2 to 3 in. of eel grass piled between the newly seeded rows really saved the day. The force of the water was broken by the mulch. The bulk of the seeds germinated. A few of the seedling celery and broccoli plants were tilted after one downpour. I straightened them out, surrounding them with little skirts of eel grass for extra support.

This year I tried something new. Live moss has been a constant plague in my rock garden. I covered sections of it with a 1 in, layer of eel grass. After three weeks, no more moss. When uncovered, the moss does not return.

The layer of eel grass seems to act as an insultating cover, holding in the heat of the soil. We enjoyed many vegetables from our garden through November: Italian parsley, beets, New Zealand spinach, celery, escarole, Chinese cabbage, Swiss chard, green curled endive and kale.

I contracted for a chemical analysis

of eel grass. The accompanying list shows the many trace elements that are found. From this analysis, it would appear that eel grass and seaweed share the same richness of trace elements. Perhaps other similarities will be found in the future.

Lee Gardner, cooperative extension agent at the University of Rhode Island, wrote me that "vast tons of sand-free algae (seaweed) are available to farmers here in Rhode Island where the 'right of passage for the collection of seaweed by farmers' (a practice from Colonial Days) is still strictly enforced."

A number of studies have been done using seaweed as a mulch, in compost, as a fertilizer, as a "tea" or dry. The Horticulture Department of Clemson University in South Carolina has investigated its effects on crops and found after a three-year study that growth-promoting properties of seaweed are definitely present in sufficient amounts to stimulate plant growth. Another group of substances are found in seaweed and not in land grown plants, which increases the beneficial flora in the soil and which prevents soilborne diseases. More experimentation needs to be done.

I urge gardeners to try eel grass in their gardens. In this era of inflation and shortages our friend Vallisneria has many advantages-it is free for the taking; it is available year-round; it is

plentiful, and finally it is a pleasant excuse to go out to the shore.

Carolyn Aquino Berger graduated from the horticultural program at Temple University, Ambler Campus. She has worked as a horticultural therapist at Eagleville and Einstein hospitals, and has been a publicity consultant

Chemical Analysis of Eel Grass

for the Morris Arboretum.

Moisture at 100°C. 62.6% Total Kjeldahl Nitrogen (N) 0.56% Total Phosphorous (P2O5) 0.10% Potash (K₂O) 0.08% 1000 ppm Iron (Fe) 200 ppm Manganese (Mn) Copper (Cu) 10 ppm Zinc (Zn) 27 ppm Boran (B) 1700 ppm Molybdenum (Mo) 7 ppm 6600 ppm Magnesium (Mg) Calcium (Ca) 8000 ppm

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Working Toward a Year-round Vegetable

My wife and I have enjoyed vegetable gardening during the past few years. Having grown the traditional summer vegetables, there was always an overabundance of cucumbers, squash, tomatoes, and beans that continued to yield until the first frost. We do not freeze or can vegetables, so we gave away or threw away much of the produce. After giving some thought to our selection of vegetables, we started looking into hardy and semi-hardy varieties that could be harvested in fall, winter, and early spring. Our goal was to have a long harvest period of vegetables needing a minimum amount of winter protection or special storage.

We have not eliminated our summer vegetables but have drastically reduced the space and labor devoted to them, growing just enough to satisfy our daily needs when they are in season. We have also upgraded the quality of summer vegetables since only a few plants of each kind are needed. The rest of our gardening time is devoted to crops that will be harvested from September through April.

To make the crop transition, we started with root crops. First we experimented with carrots. Instead of sowing seed in April, it was sown in July for harvesting from September through March. Sowings can be staggered throughout the month so one is not faced with the maintenance problem of having to weed numerous rows of seedlings all at once. Avoid varieties of carrots that are harvested at an early age. Varieties that are recommended for winter storage have been successful for winter harvesting. Carrot foliage is

quite hardy and will continue to grow well into the fall. As the weather gets colder cover any exposed root tops with soil. That protects them from frost damage, yet allows the tops to continue growing if there is a mild fall.

We are also trying varieties of winter hardy leaf crops such as lettuce, cabbage and spinach, which will be sown in summer or fall to be harvested in early spring.

It has been our experience that the flavor of carrots improves as the weather turns colder.

Another root vegetable, salsify or vegetable oyster because it has a flavor reminiscent of oysters, has also been satisfactory for fall and winter use. Seed should be sown in a row in May and thinned to 3 in. apart. The roots stay in good condition all winter. Make sure all roots are out of the ground before the garden is rototilled in the spring. If roots are left, the cut up pieces will sprout and have to be weeded out.

This past year we grew beets for the first time. The variety selected was Long Season or Winter Keeper, distributed by Harris Seed Co. Sown in a row in midsummer, they germinated quickly and were thinned 4 to 6 in. apart. Long Season beets become quite rough looking but retain good flavor. Although they hold up well in winter, the beets may be damaged if not protected from severe freezing.

After we found good recipes for parsnips, they became a welcome addition to our winter harvest.* Seeds are sown in a row in May and thinned to 3

larly satisfied with Harris Model. Parsnips are best harvested in late fall through late winter. Once plants begin to grow in the spring, the roots lose much of their flavor.

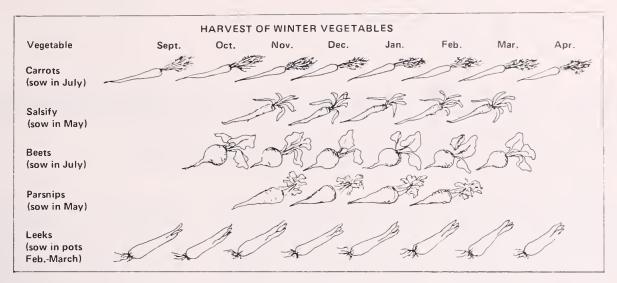
to 4 in, apart. We have been particu-

Hardy varieties of leeks are perhaps the sturdiest of the vegetables harvested in winter. Leek seed should be sown in a pot or flat in February or March. Grown under very cool conditions, the seedlings can be left in the seed pot until they can be moved into the garden in April. Seedlings should be planted 3 to 4 in. apart in trenches 4 to 6 in. deep. As the leeks become taller and thicker, the trenches are gradually filled in to develop the long white stalks. Once the trenches are completely filled in, there is very little to do until harvest time. Leeks can be used almost any time during the growing season. We prefer to use the crop exclusively from late fall to early spring.

Traditionally, root crops were dug in the fall and stored in peat or soil in root cellars and barns. We leave the crops in the ground and harvest them as needed. To prevent the ground from freezing around the roots we cover the crops with leaves as the weather gets progressively colder. Depending on the temperature, crops should be covered between the end of November and the end of December. Covering too early may force the foliage of some plants to keep growing. It may also attract rodents. Covering late in the season reduces the chance of an infestation.

Depth of leaf cover is contingent upon the severity of the winter. In mild winters very little cover is needed.

*We've been using *Cooking with Vegetables*, Alex D. Hawkes, Simon & Schuster, N.Y., 1968.



Garden: The Winter Harvest & by Thomas Buchter



A two foot depth of leaves prevents the soil from freezing even in very cold seasons. After the rows are covered, it is important to mark them with a tall stake so they can be located when the garden is covered with snow.

We've been able to harvest root vegetables through the winter successfully. We do not have to double handle crops, which is done when they are put into storage. They are chilled and firm since adequate moisture is in the garden soil. We have not experienced a winter when it was impossible to har-

vest the crops. By March we remove all root crops, plant debris, and leaves from the garden. This is for sanitation and makes preparation for spring sowing easier.

We are refining our root crop choices and expanding our hardy vegetable selection to include broccoli and brussels sprouts for harvest in fall and early winter. We are also trying varieties of winter hardy leaf crops such as lettuce, cabbage and spinach, which will be sown in summer or fall to be harvested in early spring. Although

these crops have been grown in Europe successfully, their winters are usually milder and more stable than ours. Perhaps many of these leafy vegetables will be able to withstand our winters with minimal protection.

We will probably have some failures as we try new vegetables, but the pleasure of harvesting fresh vegetables throughout the year makes it a worthwhile and challenging project.

Thomas Buchter is associate director of the Henry Foundation.

Some Useful Landscape Design Books for Small Suburban Properties



My wife and I garden on a suburban lot 100 ft. by 270 ft. I remember when we came to the area some years ago I wanted two or three acres. Now we feel that our knowledge and pleasure in gardening have been increased and intensified because of the limitations of space.

The classical concepts of landscape architecture are of the past. We must enjoy them as spectators. Today, we cannot fill in a marsh and remove a "mean huddle of houses" as Louis XIV could to allow LeNotre to create the beauties of Versailles. Much the same applies to the creations of Repton, Capability Brown and A. J. Downing. Frederick Law Olmstead changed the contours of many acres to create Central Park in New York City. However, the basic principles of balance, proportion, mass, texture and color still apply to the creation of a satifying personal property.

We found the *Book of Landscape Design* by H. Stuart Ortloff and Henry B. Raymore to be well suited to our needs. These men are nationally known lecturers, educated in and practicing landscape design. They write for the layman. The book is an overview and all aspects of the subject are covered in 300 pages. The aesthetic rules of landscape design are well explained in a chapter of that title. The value of the book can be summed up in one quotation by the authors:

"One should never say, 'I hate anything formal,' or, 'I dislike wild, natural, unrestrained growth,' but rather one should let the solution of the problem grow from the basic circumstances of the site, the neighborhood, the life of the family, its economic and social needs and many other factors which have nothing to do with 'formal vs. informal.'"

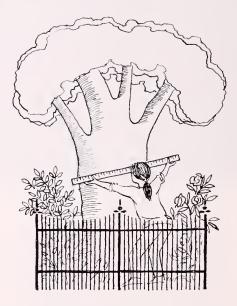
the limitations of a suburban garden

Suburban properties impose several limitations that must be dealt with. The trees and shrubbery on the neigh-

bor's property only a few feet away may limit your possibilities in the adjacent area. The continued growth of trees and the houses across the street have an effect on your property. You must adapt to them. My neighbor said this summer "Dave, I used to have

Nichols says, "Every conifer has a definite personality of its own and which proclaims itself from its earliest youth, and to buy a tree, even a baby, from a catalog is as foolish as to adopt a child by parcel post."

such beautiful zinnias in this bed. The last two years they've been terrible. I must have lost my green thumb." Next door the oak tree has continued to grow



and now allows only three hours of sunlight for her zinnias in midsummer.

We need to study the influence of environments on growth. The basic story is told in a series of essays by May T. Watts in *Reading the Landscape*. These delightful essays written in nontechnical, chatty prose cover all sectors

of our country. The interrelationships of climate, animals and plants are clearly presented as Watts takes the reader up mountains and down ravines. The bibliography at the end of each chapter is extensive and numerically keyed to the text for further experiences in this kind of study.

We have a large maple in our back yard. Years ago we reveled in its shade but now its roots extend into practically all our flower beds. Help arrived from English author Beverley Nichols, whose book Garden Open Today tells among many other things how he deals with tree roots. He recommends containing tree roots by digging a trench around the tree about two feet deep and placing a solid barrier of concrete blocks in the trench, then filling the balance of the trench with soil. Generally, it is safe to prune the roots of smaller trees to a radius of 6 ft. from the trunk, according to Nichols.

His book is filled with a discussion of ordinary garden problems and solutions. He writes at length of his favorites and each chapter offers a delightful mixture of expert advice and personal experience. Nichols gardens in England and as John Kieran points out in A Natural History of New York City his city is 700 miles south of London. The weatherman tells us each night that our weather comes to us over land from the west, north and south. English weather travels only a short distance over land and brings with it the influence of ocean currents and moisture from water. What this means is that we are careful not to accept statements of hardiness and growth patterns without comparing with local sources carefully. Returning to Nichols, almost every page contains a gem. He says, "Every conifer has a definite personality of its own and which proclaims itself from its earliest youth, and to buy a tree, even a baby, from a catalog is as foolish as to adopt a child by parcel post." Chapters include selection by colors, water magic, fragrance, roses and others. Unlike many other authors

Nichols writes freely of his failures and disappointments. To hear of failure from one so experienced gives me hope.

how to get the job done

If we were starting over I think I'd plan the size, location, and shape of our beds, call in a crew of workmen, have all of the soil to a depth of 12 in. removed and replaced with a "loose, friable" soil as the seed packets say. Building good garden soil is long work and those who advocate homemade compost as a sole solution are oversimplifying. The amount of compost required to improve the clay left by contractors is considerable. A 5 ft. x 15 ft. bed prepared to a depth of 1 ft. is 75 cu. ft. Choose any acceptable soil mixture say, 1 part soil, 1 part humus or compost or Canadian peat and 1 part sand. The big bales of Canadian peat at the garden centers are packed tight and contain 6 cu. ft. (more when fluffed up). This bed would require four of these bales. Then add the sand and you wind up with a good flower bed and quite a bit of poor soil to get rid of. The factors involved in having good soil are covered well by Ortloff and Raymore in A Book About Soils for the Home Gardener. This text of 180 pages covers the kinds of soil. fertilizers, importance of water, control of water and even a chapter on the tools a gardener should have. Helpful suggestions are on most every page. Example: "Many gardeners feel that the soil must be constantly kept in a loose fluffy condition. This is not so and a word of caution is in order." The authors explain that recent experiments show that overly intensive cultivation may so change the soil structure that its pore spaces are destroyed or decreased. The benefits of each chemical required for balanced plant growth is discussed. Even the most experienced gardener will improve his knowledge and gardening quality from the experience of these men.

I have left the selection of trees, woody shrubs, perennials, annuals and

bulbs until last because the choice among gardeners varies so widely. Garden magazines are filled with "how to" articles on so many that it becomes redundant. I suggest you study carefully before selecting any tree. Today a certain tree may be fine but will it be 10 or 20 years from now? I like the help furnished by Nature's Guide to Suc-



cessful Gardening and Landscaping by William Flemer III. His book contains many tables comparing trees and large shrubs of all types. Ultimate height and hardiness are listed for each variety included. Flemer, a nurseryman in Princeton, NJ, discusses all aspects of his subject but seems most at home with trees and offers much help on placement, care and the special characteristics they each possess.

Donald Wyman's *Dwarf Shrubs* takes care of the balance of the woody material you might want to choose. The scope of the book is explained by the author in his introduction as he says, "The woody plants that are considered dwarf in these pages are those 3 ft. tall or less when mature." Ample classification tables are included by category. The index in the back lists each shrub in the text as well as its popular name if there is one. An excellent reference book covered in 130 pages.

According to the classical school of landscape design "color is a bonus." Insofar as the suburbanite is concerned I believe it is very important. The suburban property must display color if it is to identify itself from its neighbors. We have read many books that discuss perennials, annuals, biennials and bulbs together and in separate volumes. Ortloff and Raymore furnished us with one book that covers them all. Their book Color and Design for Every Garden is one of the most comprehensive texts we know of. There are designs by shape, color, season and scale. In addition there are lists of plants, textures, colors and foliage. The color schemes and variations are almost endless. These are all supplemented with helps such as "Often when a designer has been bold for a moment, he spoils a sharp contrast by introducing white, long considered the one color which is safe. Yet white can drain off too much of the deeper vibrant color. . . a better method of holding down vivid contrasts is to reduce the quantity not the quality of a composition."

With a new garden season about to begin, I hope you'll take advantage of these books and look for better solutions to the problems you have.

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Reading the Landscape, May Theilgaard Watts. Macmillan, New York, 1957



David L. Tyler lives in suburban Philadelphia and has been a hobby gardener all of his life. He has been a PHS member since 1954. Tyler has taken some Longwood Garden courses, some PHS courses and enrolled in the School of Landscape Design conducted by the Garden Club Federation. His main gardening interests are azaleas and dwarf rhododendrons.

Hardy Fuchsias in the Delaware Valley



by Charles O. Cresson

I was first introduced to the hardy fuchsia, Fuchsia magellanica, through an attractive mail order catalog, which claimed the plant was hardy outdoors. I was skeptical. I checked at a local arboretum, and they too were skeptical. My curiosity finally won out and now, five years later, I still have my original plant growing in the garden. It gets bigger and better every year and blooms from late June until frost. Last year the frost was so late that there were still a few flowers at the end of October.

The hardy fuchsia is a miniature of the more commonly seen large flowered hybrids. Small 1½ in. blossoms hang from the branches in profusion. The sepals and tube (outer parts of the flower) are red with the violet-blue petals peeking out from under the sepals. Keeping in scale with the flowers, the leaves are also reduced in size.

In the Delaware Valley, winter kills the stems to the ground but in spring vigorous shoots will arise from the base. By the time flowering commences in late June or early July the shoots may already be as much as 2 ft. high, depending on the variety.

Researching further, I discovered that in milder climates Fuchsia magellanica can become quite a large rounded shrub, reaching 8 ft. in height. The larger stems have papery tan bark. Popular as a garden plant in the British Isles, it has escaped to grow wild in the mild climate of Ireland.

A native of Chile, the hardy fuchsia occurs over a range of 1,500 miles extending south to the frigid Straits of Magellan. It can be found in thickets from the Pacific coast into the lower elevations of the Andes.

Historically, Fuchsia magellanica is of interest because it is probably the first species to be introduced into cultivation. It is unclear just how it reached England but it is thought that a sailor took it to his mother in London. A local nursery firm discovered it there brought it into commerce in the late 1780's. Whether this was actually F. magellanica or the closely related F.

coccinea is not certain, but before long both were in cultivation and the former predominated due to its superior hardiness. In the years that followed, natural varieties of F. magellanica from different localities in Chile were introduced that differed in habit and flower shape; such varieties as gracilis, conica, and discolor constituting the first garden varieties of fuchsias. These varieties and the early hybrids are of special interest to us because of their hardiness. The hybrid 'Riccartonii' originated as a chance seedling in Scotland

Historically, Fuchsia magellanica is of interest because it is probably the first species to be introduced into cultivation.

around 1830. 'Corallina' was produced in 1842. Today's race of popular fuchsia hybrids began when F. magellanica was crossed with F. fulgens and other tender large flowered species.

Hardy fuchsias are not new to this country either. They had been grown in parts of New York state as early as 1940.

Fuchsias are not fussy about soil but a heavy poorly drained soil in a hot location seems to encourage the fatal wilt disease. A rich well-drained loam is most suitable.

Choose a location that receives afternoon shade and sun only during the cooler parts of the day. Even in heavier shade you can still get moderate bloom. Hot afternoon sun can check flowering in midsummer and also attracts Japanese beetles, which are not a problem in shade.

A fine textured plant, Fuchsai magellanica is best when viewed at close range. That and its cultural requirements make it a perfect candidate for a bed next to a cool patio where leisurely summer afternoons and evenings are spent. Hardy fuchsias are also suitable for the front of a shrub border, a shaded perennial bed or to provide summer color in a woodland garden.

General care is really quite simple.

A light mulch practically eliminates weeding. A good general fertilizer, though not essential, will improve vigor and flower production.

planting

Spring is the best planting season so they will be well established by winter. Set the new plants as much as 4 in. deeper than they were previously grown and fill in the soil around them in the autumn. At least two or three stems will originate below the soil and more buds will then be protected for the following spring. When transplanting use the same technique as it helps to increase the size of the plants. Given a good start, they can be left alone for years.

Just to be on the safe side it is a good idea to apply a 6 in, mulch in the fall to keep the soil from freezing too deeply. The mulch should be as fluffy as possible since the air spaces provide additional insulation. Salt hay, pine needles, or even oak leaves are good but not maple leaves or the like as they mat down too much by spring. To prevent the leaves from blowing away, hold them down with sticks, evergreen branches, or anything of this nature laid on top. I leave the old fuchsia tops on until spring, mulching around and between the stems, which helps to keep the air spaces open. Remove the mulch and cut the dead stems to the ground before growth begins in the spring.

Among the hardy fuchsias there are many forms to choose from, offering considerable variety. I have not tried all of them in our climate but some are bound to prove hardier than others. The first group listed below should be successful in the Delaware Valley:

• F. magellanica gracilis (also known as var. macrostema) is characterized by long narrow flowers with sepals twice as long as the petals. Most of the plants sold simply as F. magellanica seem to belong to this variety. I have two forms. One is of upright habit while the other, spreading and prostrate, would be suitable for



Fuchsia magellanica (Barnes Foundation form) on terrace in Swarthmore.

hanging over a wall.

- · 'Scarlet Beauty' and 'Senorita' are said to be hardy selections.
- · 'Riccartonii' is a vigorous hybrid with globular flowers.
- · 'Corallina' deserves special note as an ornamental hardy hybrid. It has flowers and leaves twice the size of the others and forms a neat mound over a foot high. The recent severe winters have not discouraged it.

Any form of Fuchsia magellanica is worth trying. The following varieties might be particularly interesting but their hardiness is undetermined:

• F. magellanica conica (var. typica) comes from the colder south of Chile. It is rarely grown, possibly

because its flowers are smaller. It is distinguished from var. gracilis by its sepals which are almost as short as the petals.

- F. m. gracilis 'Variegata' has leaves with white margins.
- F. m. gracilis 'Versicolor' and 'Folia-Variegata' have variegated foliage suffused with pink.
- F. m. molinae and 'Maiden's Blush' have pale pink flowers and are less vigorous.

Of the many fuchsias that you can buy in garden centers, only certain forms of the magellanica are hardy in the Delaware Valley. I have great hopes that hybridization will add to the varieties suitable for use as perennial garden plants. Even now hardy fuchsias are worthy of greater popularity and can be a novel addition to most gardens.

Sources of Hardy Fuchsias

Some local nurseries and garden centers International Grower's Exchange, Box 397, Farmington, Michigan 48024

Lamb Nurseries, E. 101 Sharp Avenue, Spokane, Washington 99202, offers several varieties

Way side Gardens, Hodges, South Carolina 29695

Charles Cresson, a graduate from the University of Vermont, is a horticulturist living in Swarthmore. He is interested in hearing about other gardeners' experiences with hardy fuchsias.

The Ugly **Roof Drain**



by Glenn B. Geer

A downspout emptying near a patio can pose the hard-to-live-with problem of roof water washing soil across the patio. The immediate solution is to attach a drain pipe to the downspout to lead the water past the patio area. This solves the initial problem but creates another; it is ugly.

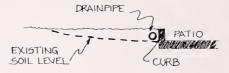
Ugly drain pipes are often buried, quickly solving the aesthetic problem. But burying a drain may mean trenching long lengths of pipe before a lower elevation suitable for dumping the drain water can be found. It is also a lot of work and expense.

This problem was taken care of at my home by burying the drain pipe above the existing level of the soil. A 4-in, drain pipe ran parallel to the patio on top of the ground. A 6-in. curb was placed between the drain pipe and the edge of the patio. Then the ground level behind the curb was raised to the height of the curb, just covering the drain pipe. The end of the pipe was covered with a small grate to keep animals out.

Since there were only 2 in. of soil covering the pipe there was not much room to plant anything. It seemed this was still going to be an ugly space until I discovered a beautiful low evergreen. I found the plant growing quite vigor-



Pipe area covered with sedum.



ously across the floor of a greenhouse at Temple University, Ambler Campus, where I work. The plant appeared to be an ideal ground cover for the drain pipe area, but I needed to find out more about it.

After searching the campus library and making some inquiries, I was able to identify the plant as Sedum album, stonecrop. It is a smooth perennial

herb, with creeping stems. Its leaves, about a quarter of an inch long, grow alternately along the stem and the plant produces lovely white panicles of flowers in June. Its shallow roots lie within the top inch of soil. That made it ideal for the situation. It also spreads rapidly as an evergreen mat across the soil surface. The plant grows about 2 in, high and the flowers may stand up another 2 in. It does well in full sun but light shade is no deterrent.

Sedum album is not readily available at nurseries but there are other varieties of sedum which will do as well in a similar situation. Sedum acre is a popular one, and is very similar in habit of growth. It produces yellow flowers instead of white.

From a garden designer's point of view, the curb served to enhance the patio. It gave definition to the space by outlining the edge of the patio, yet it did not appear to be constricting. The low evergreen mat of sedum sometimes grows over the edge of the curb, softening the hard concrete edge. The mat extends from the patio over the drain area to a privet hedge giving the illusion of a wide patio space.

Glenn B. Geer is assistant professor of landscape design at Temple University, Ambler

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THE

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Front Sycamore

Cover: photo by L. Hampfler

Back Beech

Cover: photo by L. Hampfler

Correction

The photograph of the snapdragons on the cover of the May issue was inadvertently credited to the author of the article. The photograph was taken by Jacqueline Denning.

GETTING BACK TO THE BASICS IN HORTICULTURE

by Ernesta D. Ballard

Anyone reading this issue will be impressed with the wide range of knowledge and skills that underlie horticulture. George Manaker makes us wish we knew more about biology and botany, and geography. M. M. Brubaker reminds us of the importance of organic chemistry and common sense, and Richard Bailey looks at the complexity of something as basic as soil.

The planners, Ed Lindemann, Mary Lou Wolfe, John Kistler and Libby Goldstein, turn our attention away from science and tell us to look before we plant. Again, the range is wide. We are urged to consider every aspect of the site: what are its limitations; what use has been made of it in the past; what do we intend to use it for; how do we want it to look. The basics here are aesthetics, design, construction, soil science and plant material.

Finally, we come to some topics that might be considered the most basic of all, trees, plants and tools. Once more, there is an extensive sweep of information and interest. Jane Pepper is dealing in hundreds of dollars and scores of years. In Jane Lennon's sphere, five dollars is a significant sum and three or four weeks are long enough to produce results.

What it all adds up to is that a horticulturist should never stop observing, inquiring, trying, teaching and learning. That is why horticulture is, as the founders of the Society said, one of our "most rational and pleasing amusements."



A ball of hot gases moves 93 million miles out in space. It rises and sets daily, providing light and heat and making our weather. For at least 500 million years this sun has been shining. It will probably continue to do so for hundreds of millions of more years. If it vanished from the sky, total darkness would descend upon the earth; extreme cold would prevail. Winds and tides would cease. All vegetation would die. Life would end.

With the possible exception of lunar tides, volcanoes, hot springs, and atomic energy, the sun is the direct source of all energy. The sun provides the energy in coal and oil. Water and wind power depend upon the sun, as does all of our food energy.

The food energy is derived from photosynthesis, the most important photochemical process. In that process light energy from the sun is stored as a sugar, glucose, made from carbon dioxide and water in the presence of chlorophyll. Occurring only in certain cells of green plants, photosynthesis generates the food on which all life depends. Oxygen is also produced in

the process. The sugar from photosynthesis may be burned directly to provide the energy for life, or it may be transformed into other carbohydrates including starch and fats, proteins, vitamins and other essential sub-

In Philadelphia, long daylight hours are accompanied by brighter light. That explains why plants grow faster in spring and summer, with one day in June and July equaling about three days in January and February in terms of plant growth.

stances for use in growth and development, or stored. We, in turn, eat plants for the nourishment they contain. Other animals, too, eat plants and store the food energy in their tissues. Thus the food energy derived from eating a broiled steak or grass had its ultimate source in the sun.

Other plant processes require light. For example, light is required to synthesize chlorophyll, the green pigment in plants. When grown in total darkness

leaves will not be green. Another process is gas exchange, which takes place through the stomates. These pores in the leaf are typically open during the day and closed at night in temperate species. When open, carbon dioxide and oxygen rapidly diffuse in and out of the leaf. Water vapor lost in the process of transpiration also leaves the plant primarily through the stomates. Light may influence flower initiation, development of other plant parts, seed germination and the onset of dormancy. It also influences production of anthocyanin, a red pigment; mineral absorption; translocation, leaf drop; direction of growth and may cause sleep movements such as the bending of leaves of the maranta (prayer plant) at night.

Sunlight is variable, particularly in amount or intensity, and in duration or length of daylight. Both aspects influence our gardens. Quality, or color, of sunlight, while less erratic, also deserves consideration.

light intensity

The intensity of sunlight varies with the time of day, season of the year, latitude, altitude, topography, and amount of water vapor, dust and smoke in the air. It is usually measured in footcandles (fc). Light intensity increases from sunrise to midday and gradually decreases toward sunset, and may reach as high as 10,000 fc on a sunny, summer day in Philadelphia. It is highest in summer, moderate in spring and fall, and lowest in winter when it may be less than 500 fc if the day is overcast. In the average lighted home, light intensities range from 15 fc for dining to 30 fc for reading, 100 fc for sewing, and rarely exceed 300 fc.

Intensity is highest at the equator and decreases toward the poles. At the equator, the sun's rays strike the earth at a very high angle, while at latitudes north or south, they strike the earth at an oblique angle and are filtered by a greater depth of atmosphere. The higher the altitude, the more intense the radiation. Local topography also affects the intensity of sunlight with north-facing slopes having lower light, and colder temperature, than a southfacing hill which will be hot and may be droughty. Vegetation may vary in the two areas and is particularly dramatic when ascending high mountains such as the Rockies. Differences may be observed, however, even where a road has been cut through a modest hill. Every day, I pass through such an. area. Although many of the plants are the same on both sides of the road, growth on the south-facing slope resumes earlier each spring. Crown vetch is extensive. The north slope has considerable shade with little crown vetch. Snow also melts faster on the warmer, south-facing slope. Light intensity will also be reduced at times when water vapor (clouds), dust, smoke, and other pollutants are high.

How does light intensity affect plants? For every kind of plant, there is an optimal range of light intensities. Within that range, if other factors are favorable, the rate of photosynthesis will be high and respiration (food utilization) will be moderate. Thus, abundant food is available for plant growth. The specific range varies with the plant. Shade plants such as ferns, impatiens and foliage plants require low light, while roses, tomatoes, chrysanthemums and most annuals grow best in full sun. Abelia, barberry, boxwood, dogwood,

and forsythia grow in a wide range of light intensities.

When light intensity is below the adequate range, there is less photosynthesis, and, if respiration continues at a moderate rate, there will be little or no excess food for growth and development. Thus, most plants grow poorly in low light. That explains why plants grow slowly indoors in winter; leaves drop from foliage plants moved directly indoors from outdoors; adequate spacing of plants is necessary; and hedges should be wider at the bottom than at the top. In dense forests, many herbaceous plants complete their life cycle before leaves appear on trees. Few understory plants grow in dense woods because of low light. Symptoms of low light injury include lack of vigor; weak, elongated stems; small leaves; yellowing or fading leaves and discolored flowers; leaf and bud drop. Plants may prematurely die. On plants adapted to low light, leaves are usually broader, thinner and greener than those in the sun, even on the same plant.

Light intensities above the optimal range may be excessive and cause injury. A single leaf may not use more than 1200 fc, but because of shading, the entire plant responds to brighter light. Light intensities beyond 4000-5000 fc do not usually increase photosynthesis because some other factor, probably CO₂, becomes limiting. In high light, chlorophyll may be irreversibly destroyed, producing yellow-green leaves that may appear scorched. Photosynthesis is reduced due to leaf injury and increased leaf temperature.



Tomatoes require high light intensity.

Also, as leaves warm up, transpiration (water vapor loss) increases, and the stomates close. Carbon dioxide is not available and food making is reduced. High temperatures associated with bright sunlight may inactivate the enzyme systems changing starch to sugar. Sugars accumulate in the food making cells causing a further decline in the rate of photosynthesis. For these reasons, greenhouses are shaded in summer and many ornamentals must be given shade.

duration of light: what happens in long days and short days

Everyone is aware of the seasonal variation in length of daylight. At the spring and fall equinox, March 20 and September 20, respectively, the sun is directly over the equator, and there are 12 hours of light and 12 hours of dark everywhere on the earth. As autumn proceeds, the sun moves south. and, in the Northern hemisphere, December 20, has the shortest light and longest dark period. On June 20, the sun is farthest north and the Northern hemisphere experiences the longest light and shortest dark day of the year. For the earth as a whole the light period ranges from 0 - 24 hours. At 40° (Philadelphia), there are 9.3 hours of light and 14.7 hours of dark on December 20, which gradually increases to 15 hours of light and 9 hours of dark on June 20, before it again begins a decline.

How does length of daylight affect our gardens? First, the relative amount of food made by plants in long daylight periods is greater than in short. With more food, and moderate respiration, more growth and development are possible. Bear in mind, too, that in Philadclphia, long daylight hours are accompanied by brighter light. That explains why plants grow faster in spring and summer, with one day in June and July equalling about three days in January and February in terms of plant growth. People who force plants for the Flower & Garden Show must keep this in mind.

Flower bud initiation in many crops is also a response to light period. Short-day plants flower when the light period is less than a certain number of hours; the required light period varies with the plant. Long-day plants must





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have more than a certain number of hours of light each day, while indeterminate-day plants are not influenced by day length, and will flower year-round. The terms "short day" and "long day" used in referring to the flowering responses of plants are misnomers, for it is the length of the uninterrupted dark (night) period that induces the response. Short-day plants are really long-night plants.

Day length considerations are important in gardening. Radishes, lettuce, and spinach are long-day plants. Seed must be sown early in the spring or late in the summer to produce a crop. Many of our summer flowering annuals including calendula, aster, petunia, marigold and rudbeckia are also longday plants. Woody ornamentals also respond to day length; abelia is a longday plant, for example. Poinsettias, chrysanthemums, cosmos, and Junebearing strawberries are short-day plants. For outdoor culture, mum cultivars must be selected that will bloom before the first freeze. Tomatoes, peppers, african violets, and everbearing strawberries will flower under any day length.

Development of other plant parts may also be controlled by day length. Formation of bulbs on American-type onions is a long-day response, while for Bermuda types, it is short-day. We must plant varieties such as Globe and Sweet Spanish in our gardens in order to assure an onion crop. Tuberization of white potatoes and certain dahlias

is a short-day response with harvest of these storage organs late in the season.

Production of plantlets along the leaf margins of kalanchoe is a long-day response. Spidering in variegated *Chlorophytum* is short-day while in greenleaved forms it's long-day. Runner production in *Saxifraga* and strawberry and tillering in grasses are long-day responses. Plantlet production in *Tolmeia*, the piggy-back plant, is not influenced by day length.

Day length also influences the initiation of the rest (dormant) period in temperate plants. With the onset of short days the terminal bud develops and growth ceases. Physiological changes occur within the plants enabling them to withstand colder temperatures. In deciduous plants, leaf abscission is delayed in long days.

Natural day length has influenced plant distribution. Long-day plants are found only in northern and southern latitudes. Short-day plants are usually limited to tropical and subtropical regions because cold temperatures during short days in higher latitudes would kill the plants before flowering was possible.

sun's radiation

Many things happen to the sun's radiation as it crosses the atmosphere. The light reaching the earth is white light consisting of wave lengths ranging from far ultraviolet through the visible spectrum and into infrared. Fortunately, the ozone layer absorbs most of the

ultraviolet in sunlight. Ultraviolet light destroys proteins, an essential component of protoplasm, and the basis of all enzymes. Without proteins, life would not be possible. Thus the concern today about the destruction of the ozone layer. Oxygen, carbon dioxide, and water vapor absorb some of the red and infrared (heat) light. Considerable blue light is scattered, so the sky appears blue. There is some seasonal variation in atmospheric absorption.

Of the light energy absorbed by plants and soil, some is conducted into the ground as heat, a large part evaporates water, a small amount is convected to warm the air, and a small part, perhaps 1-2%, is used by plants in photochemical processes, especially photosynthesis. Visible light is most important for plant growth and development.

Visible light consists of the rainbow of colors ranging from violet and blue in the short-wave lengths to red and far-red in the long-wave. Red and blue light are the primary colors absorbed by plants although yellow and green are also physiologically active. A considerable amount of green light is reflected; hence, plants appear green.

Photosynthesis and chlorophyll synthesis require red light. Seed germination, onset of dormancy, and responses to day length are controlled by red-far-red light. Red light promotes stem elongation, and production of anthocyanin, red pigment, in coleus and zebrina leaves and apple skins, is enhanced by bright, red light. In shade,

Blue light is used in photosynthesis and chlorophyll synthesis. Phototropism, the bending of stems toward the light, is a blue-light response. Potted plants on windowsills must be turned frequently to make them grow straight. Plants in garden and greenhouse "lean" toward the sun.

In addition to light, plants are also exposed to other radiation, especially the very short-waves called ionization radiation, which includes c'osmic rays, and radioactive carbon, and potassium, radium and uranium plus x-rays and gamma rays. Such radiation may be mutagenic, and has been used advantageously by plant breeders. (See "New Plants from Radiation," by Randall P. Niedz, Green Scene, November 1979.)

Solar radiation produces heat, and

changes in temperature affect every plant process. Increased temperatures directly affect the rates of photosynthesis, respiration, transpiration and other plant processes, within certain limits. Temperatures above 90-95°F are detrimental to plant cells and injury or death may occur if the plant is exposed to higher levels. Water stress is particularly significant at high temperatures.

Winter burn of certain broad-leaved evergreens illustrates well the effect of heat injury. On a cold, bright winter day, sunlight warms the leaves of rhododendron or other genera. Stomates in the leaves open, and water evaporates at a rapid rate. The soil water is frozen and cannot be absorbed by roots to replace that lost by the leaves. Thus, leaf tissue dehydrates and dies. Typical scorch symptoms appear.

Burlap screens prevent temperature fluctuation and eliminate the problem.

From this brief discussion, it should be obvious that the sun exerts profound influences on our gardens and ourselves. More than ever, we must learn to capitalize on the benefits it provides. It is truly a friend upon which we all depend.

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LIGHT DURATION: HOW IT AFFECTS PLANTS

SHORT DAY		PLANTS NOT INFLUENCED BY DAY LENGTH		LONG DAY	
Responses		Responses	Examples	Responses	
Fosters dormancy	Terminal buds develop Growth ceases	Flowering	tomatoes peppers	Increases amount of food made by plants	
	Plants can withstand cold	Discribes a finite	african violets	Delays onset of	
	Short-Day Plant Examples	Plantlet production	Tolmiea	dormancy	Long-Day Plant Examples
Flowering	poinsettias chrysanthemums cosmos				radishes lettuce spinach
Bulb formation	bermuda onions			Flowering	calendula
Tuberization	white potatoes certain dahlias			ÿ	aster petunia rudbeckia
Offsets or spidering	variegated chlorophytum				abelia
				Bulb formation	American type onions
				Plantlets production	Leaf margins of kalanchoe
				Spidering	Green-leaved chlorophytum
				Runner production	saxifraga and strawberry

LIGHT INTENSITY: HOW IT AFFECTS PLANTS

Low	inten	SIT	У
Exan	nnles	Ωf	nlants

oles of plants that do well ferns

impatiens foliage plants

High Intensity

Examples of plants that do well

tomatoes roses

chrysanthemums

A Range of Light Intensities

Examples of plants that do well

abelia harberry bo xwood dogwood forsythia

Symptoms of too low intensity

lack of vigor weak elongated stems small leaves yellowing or fading leaves leaf and bud drop

Symptoms of too high intensity

leaves yellow - appear scorched

chlorophyll destroyed



Landscape Design:

an introduction and two perspectives, starting from scratch and starting over.

an introduction



by Ed Lindemann

A landscape is essentially that portion of the land that the eye can see at a glance. As we move our eyes, our line of vision changes constantly, so too does the landscape. Any design is the arrangement of elements. In a landscape design there are two varieties of elements. First, the basic elements of design: line, shape, texture, size, mass and color. Second, living plants and non-living architectural features. Plants complicate a landscape design because they have specific cultural requirements to keep them alive, and they change appearance and shape with the seasons and age. In a landscape design we must connect line, shape, texture, size, mass and color to the landscape elements and arrive at a practical arrangement for function and enjoyment. A successful landscape is the result of a successful design.

When planning it is important to understand the elements of design.

Line is the area of direction between two points either curved or straight.

Shape is the area enclosed within a line or series of lines.

Texture is an important element because it satisfies both sight and touch. We absorb the surface quality or texture of an item.

Size refers to the area in which a design functions. Size is also synonymous with scale or the relation of one part of the design to another.

Mass is simply the three dimensional counterpart of shape.

Color is not essential to a design since it is possible to have an excellent design composed of only black and white elements; however, in a landscape color is always present and therefore tends to be extremely important. I find that there are two groups of people when it comes to working with color, those who are at ease and use it successfully and those who are apprehensive and who lack good color sense. If you tend to have a problem working with color, I suggest that you start with monochromatic color schemes using varied tones and shades of one color. It is almost impossible to make a mistake with a monochromatic color scheme.

Look at a garden with a designer's eye, relating its components to line, texture, mass and so on. Using these design elements decide what you like and dislike and determine why. You will find that you will become more critical, and at the same time more appreciative, and therefore as a result have a better plan. Start by making a basic plan of the property or area to be worked on. Work with the larger areas first. Think of plants in terms of mass, size, and texture rather than specific species or cultivars. Decide what you like and what you want to keep, what you want to relocate, what you want to remove and what you want to add. The last thing to do is to choose the exact varieties of plants. Let the choice of plant derive from the design. Combine the eye of a designer with the know-how of the plant specialist to create a practical arrangement of plant and architectural elements for human use and enjoyment. Following this article are two approaches to design needs. One, by Mary Lou Wolfe, deals with what you do with redesigning an established garden and John Kistler provides several solutions for starting from scratch.

The late Thomas Church summed it up when he said, "The only limit to your garden is the boundaries of your imagination."

Ed Lindemann is the designer for the Philadelphia Flower & Garden Show.

Landscape Design:

starting from scratch

by John Kistler

When planning a property from scratch, the main goal of the landscape architect is to use the land to best suit human purposes. Consequently a good landscape architect ascertains the client's needs, particularly in relationshop to his life style. Ardent golfers, who do not plan to hire a full-time gardener for example, certainly do not want a formal garden. Indeed, a large lawn might be nice for practice putting, but who is to maintain it? Perhaps large drifts of groundcovers and some shrub borders are the solution so that all of the golfers' spare time can be spent on

the golf course.

After the needs are discussed, the landscape architect studies the property to determine which areas can be designated for which specific use. He then creates a general plan to be followed by detailed plans. The entrance to the house, which is semi-public, should be on immediate view. Because this area is not really private, it should be neat and require the least maintenance, being the least used by the owners. Next, areas for recreation, passive or active, should be set out with privacy in mind. Then it's time to work out

the details.

The landscape architect works to enhance the architecture, which he often considers an encroachment on nature. Plantings soften the vertical lines and divert attention from monotonous sharp angles or harsh corners. Plants should be used with restraint and should not hide the building or its windows. One shrub, preferably an evergreen that will not grow out of bounds or that can be easily sheared to maintain its desired size, is usually enough for each corner. The plants soften the flow of the vertical building

G. Evans, Baederwood, Pa.

This was a sloping unusable back yard with handsome dogwood lost in the bushes. Excess shrubs were removed. The slope was graded into two levels with a retaining wall between, creating a terrace by the house and a usable level above.

Landscape Design: continued

line to the abrupt meeting of the horizontal line of the ground. (See illustrations 1 and 2.)

Low growing or espaliered shrubs can relieve the monotony of walls, or at least divert attention from them. They are also good for under windows for the same reason, but the plants should not grow taller than the bottom of the windows.

Attention should be called to important features such as the entrance, framing with a pair of plants or a balanced planting of specimen plants that will remain, or can be kept, in bounds.

Plants can also divert attention from undesirable architectural features. (See illustrations 3 and 4.)

Location governs which plants are used. Some rules of thumb are:

- In full sun: hybrid rhododendron, juniper, yew, ilex, Korean boxwood and dwarf conifers.
- In shade (north side): native rhododendron, kalmia, azalea, yew, enkianthus and English boxwood.
- Morning or afternoon sun: azalea, yew, ilex, pieris and kalmia.

recreation area

Recreation areas might be passive or active. Sitting areas, in most cases, should be level and shade should be available for at least the second half of the day. Shade is provided by trees, those natural air conditioners, arbors or the lee of buildings. Ideally some beds for flower gardening or space for container plants would enhance the area.

Active recreation, whether it is swimming, tennis or gardening requires a level space. The level space can be obtained by grading and/or terracing.

D. Campbell, Chevy Chase, Md. Corners are softened with hollies. Espaliered cotoneasters and pear trees add interest to walls. Formal plants in lead containers accent front door.

While the difference in the height of the various levels may be treated with a bank, retaining walls take up less space, eliminate maintenance, add sitting space and are an attractive feature. (See illustrations 5 through 9.)

Only after the general or overall plan is established is it time to start the detailed plans, such as a grading plan, a construction plan and a planting plan. The planting plan shows the appropri-

ate plant materials to help embellish the areas and to satisfy the owner's personal desires. With an established general plan and detail plan each area can be done as convenient or as finances allow.

John Kistler is a practicing landscape architect. He designed the Philadelphia Flower & Garden Show for four years. Kistler is a former member of the PHS Council, and an avid vegetable gardener.









B. Winn, Merion, Pa.

The sloping back yard was regraded into three levels for a sitting area next to the house, formal show gardens on the middle level and a vegetable garden on the lowest level beyond the wisteria and grape arbor.





Thom McIlvaine, West Chester, Pa.

The pool required cutting into the back yard for a level area. The retaining wall created an upper level space for a flower garden as well as more sitting spaces.

Landscape Design:

starting over.

by Mary Lou Wolfe

"Now, all that boxwood is yours, Mrs. Wolfe. I suggest that if you go away during the winter, you should arrange to have someone brush off the snow."

Is he saying I'll need a boxwood sitter?

I hate house settlements and this one had been an uncomfortable one. My trusty realtor had sent a substitute, and my husband was out of town. The keys were to be turned over at the house so that I could be introduced to the security alarm system. The seller had also mentioned a "Black Book" that went with the house.

When we arrived at the house, I was so intent on mastering the alarm system that the seller's last instructions almost missed me, but I have come to recall them well: "There may be a little water in the cellar now and then; you'll need to fiddle with that drain down by the road; follow the Black Book on millipedes."

I couldn't wait for him to leave although I knew there were questions I should be asking. The March snows were melting and I wanted to really see our garden. I glanced quickly in the Black Book: appliance guarantees, recommendations for plumbers, water testing, well repair, gutter cleaning, a 1943 property survey and, aha, a brochure prepared for a historic house tour with a diagrammatic sketch of the garden. Franklinia, stewartia, dawn redwood, davidia, laburnum and, of course, boxwood. I went off, folder and sketch in hand, through the snow.

The house had been built on a wooded hillside and was, according to the brochure, "One of seven homes Quaker Comfort built for his slaves when he freed them before the Civil War." On the uphill side, a brick terrace opened off the oldest part of the house. "Two espalier pear trees are against the wall of this charming home." Indeed, there they were, but sporting



The way it was: 1940's



The way it is now. The wing (right) was added in the 1960's. Excavated materials were moved out manually so the wisteria arbor would not be disturbed.

too much spindly growth, the newest held in place with dozens of blue twistems. "You reach the garden through a wisteria arbor." Still upright but leaning dangerously toward the house and crowned by a snarl of unpruned vines. "The wooded hillside has been magnificently civilized with a mature boxwood garden beside a giant cedar of Lebanon tree." I've never liked that word "mature" and in this case, "badly overgrown" would have been a better choice. What was marked on the sketch as "rose garden" was now a six-

inch wide canyon between rows of three-foot high boxwood, under considerable shade. Overgrown or not, it was breathtaking. There were deer tracks leading to the little pool and a pheasant squawked up in the woods. I would imagine weddings under the ancient lilacs. The brochure concluded with "David Miller will play his bagpipes in the garden, weather permitting." Who is David Miller and did weather permit? Anything could happen in this garden. I couldn't wait for Lindsay's return. He's not a plantsperson but he has a good sense of design, he's strong and I think he invented recycling. We would need all our combined talents and then some.

Lafayette's escape and commuter traffic

During that next week my husband and I made what have proved to be some sound decisions. The first of these involved abandoning the front door. As the brochure said, "The home hugs the hill that was Lafayette's escape route in May of 1778." Now, 200 years later, it is the escape route for a hectic stream of commuter traffic. It seemed that anyone with a zippy car tested its cornering capacities on our road. We decided to change the focus of the house entirely to its back or uphill side. The previous owner had made a nice beginning on this concept. We continued his start by bringing the automobile parking area closer to the back door, linking it to the house with recycled materials, flagstone and belgian block rescued from our favorite dump. We chained off the old front door entrance completely. The only visitors who have ever used it were one inebriated motorist whose car flunked the cornering test, and the movers who proclaimed "This is nothing but a damned farmhouse!"

They hit the nail on the head. This house had been a very humble farm-house, enlarged and civilized by sub-

sequent owners, but it was and, thanks to its zoning, will continue to be "country living." Inside we had uncovered our home's earlier character in wide pine floors under aging linoleum, a marble fireplace lintel masked by layers of black paint. We merged kitchen and dining room and made

"There may be a little water in the cellar now and then; you'll need to fiddle with that drain down by the road; follow the Black Book on millipedes."

plans to add a greenhouse right off the kitchen.

Our life style is casual. The work force, just we two. We knew we had taken on quite a garden and needed expert advice. Our second important decision was to consult an arborist whom we trusted. He walked the property with us as the last of the snow was melting and helped us to assign priorities. If he also saw us as long-term contributors to his children's education, he was probably right. We are scheduling major annual tree work as a budgeted expense. Our arborist shared our excitement over the plant materials, exclaiming over the 40 ft. of Chinese hemlock hedge and the well shaped Sciadopitys. We scheduled immediate drastic pruning of the boxwood and a dormant oil spray from roadside to woods line. Our third sensible decision was to see the garden through a complete year's cycle before making other major decisions.

Then came the snow melt and April rains. The whole hillside draining 2.8 acres above our house turned into an oozing, flowing cascade which, of course, ended up in our basement. "A little water in the cellar now and then." I sent an S.O.S. to our neighbors who recommended a sump pump and commiserated, "Too bad we can't bottle it.

It's wonderful water, you know." When the greenhouse was built, we added a tile drainage system and sump pump. A farmhouse, yes, but springhouse is too much.

As our diverted hillside water coursed down to the road we soon discovered why we need to "fiddle with that drain down by the road." We also found out why the plantings of Japanese holly bordering the road look so miserable. Our commuter escape route is salted intensely in winter; the easily clogged drain creates a lagoon and each uphill driver drenches our bank with salt water. We contemplate lodging a complaint with the state highway department.

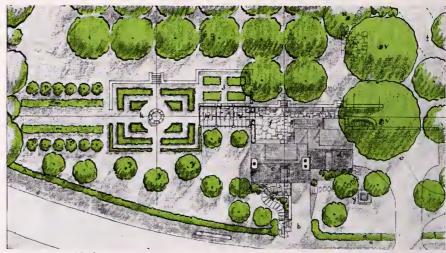
Aside from the drainage traumas, we were really enjoying our new property. I began a garden diary to note blooming dates, bird arrivals, locations and names of plants we were adding. There was a steady stream of blooms, birds and plants. The progression of bloom was extraordinary and obviously had been planned with great skill and style. Hyacinths under the espalier pears led the entries and as month after month went by, I recorded the sequence. House wrens arrived on April 10th to take over their house. The Cornus kousa lasted through June and then the bank of dwarf horse chestnut (Aesculus hippocastanum) took over. A large entry fills the page for July 8, 1978: Millipedes on the porch! We had forgotten. Quick, the Black Book! "Suggested garden care: only 1 must for millipedes. See separate sheet." This is a directive from the Penn State Agricultural Extension Service and says: "Millipedes are those 'creepy' animals that women hate to have in the house." Lindsay hated them too and read on with me: "They begin to appear on the porch, in the basement and in the house in numbers ranging from one or two to exceptional cases where they

Landscape Design: continued

may number in the hundreds or even thousands." It was right there in the Black Book. "First spray, mid-May, then mid-June and mid-July. Object of spraying: get them before breeding and emergence." By the end of July we were vacuuming them in the house and shoveling them up outdoors at the base of walls. Yes, we were the exceptional case. We survived that crawly, crunchy July but never since have neglected to spray Diazanon by hose attachment on all exterior walls, steps and on the bases of shrubs in a twenty-foot radius around the house.

From the Black Book's 1943 land survey, we knew that this house and property had once belonged to Arthur Paul, and that the land adjoining was part of Andorra Nursery. Ernesta and Fred Ballard identified Mr. Paul for us as president of the prestigious Andorra Nursery during the 1940's. Fred Ballard had grown up on property adjoining the Wissahickon end of Andorra Nursery and recalled hearing his father and Arthur Paul discussing on many an evening, the hypothetical right plant in the right place for the perfect succession of bloom. Ernesta pointed out that Arthur Paul's daughter-in-law is Lois Paul, PHS Council member and good friend of the library. The Pauls obligingly ferreted out Arthur Paul's original plan for this property, which he called "Cherry Hill." Part of it is reproduced here with the Pauls' permission. Reading the plan, I am struck with the fact that what was, in 1943 a sunny hillside of cherry trees, cutting beds and intricate rose garden bordered by a juvenile boxwood hedge, has matured into a quite beautiful but very different set of spaces. All now compete for sunlight. The strong east-west axis of the garden effectively pulls all these spaces together.

We have abandoned the rose garden for the present. Ernesta, who has conquered a similarly overgrown boxwood garden, recommends removing half of the original rows of box. Then we could reinstate the rose garden. We may do this, providing we can fit it in between millipede sprayings. We have



Detail from a 1943 property survey.

taken action on a large maple which threatened either to pull down a wall or to crash on our greenhouse. The maple has been drastically topped and an aging cherry, removed. Both are being recycled in our new wood stove.

As I sit in my greenhouse now, my view is of an upright, tightly pruned wisteria arbor, past well shaped, though still too tall boxwood, to the gangly lilacs completing Arthur Paul's vista. The *Cedrus atlantica* branches wave in and out of the vista adding just the right asymmetrical touch. Close on my left, I spy one last blue twistem on a pear branch. I realize that there will come a time when we tire of gently

knocking snow off boxwood, fiddling with the drains and spraying for millipedes. When that time comes, we too will hand over the Black Book. It will have, among other things: a sump pump guarantee, a color xerox of Arthur Paul's plan, the 1975 tour brochure, our arborist's name, and Penn State's latest word on millipedes. Hurry, children! There's still time for a wedding or two under the lilcas. David Miller can play his bagpipes in the garden, weather permitting.

Mary Lou Wolfe, horticultural librarian at PHS, is hooked on old houses and old gardens.

When you take over an old garden:

Take "before" pictures.

Ask previous owner for plans, records, hints on problems.

Make a rough plan of existing garden.

Determine your boundaries: whose property is the fence or hedge really on? who maintains? Get a soil test from your local Cooperative Extension Service. (See page 26.)

Watch how water drains, where snow melts first, prevailing winter wind direction, noise problems.

Identify major trees and shrubs.

See the garden through one growing season before making drastic changes.

If you think you have tree problems, consider consulting an arborist. (See page 28.)

Get advice on priorities: is a dormant oil spray needed in early spring? what *must* be pruned and *when*?

Determine your needs: e.g., children's play space, pet quarters, parking, adult sitting areas, vegetable garden.

Begin a long-range plan.

Keep a garden diary: bloom dates, disasters, triumphs, ideas for future.



A garden bordered by Japanese hemlocks, Tsuga diversifolia, looks up toward a wooded hill.



The east-west axis from the original plan incorporates wisteria, boxwood, and lilacs.



A weeping cherry, Prunus subhirtella pendula, frames the terrace from the hillside above.



Getting the Plant and Getting It into the Ground

by Jane Lennon

Plants come into our gardens as seeds, roots or bulbs, as dormant plants or as actively growing plants, in containers or dug from the garden.

In the Delaware Valley area there are many excellent growers, nurseries and garden centers to supply our plant needs. Plant sales are held each spring at local churches and arboretums, by plant societies and garden clubs. Mail order nurseries, seed and bulb houses offer a wide range of plants to further tempt us. Generally the plant grower or supplier can provide us with planting and growing information, and catalogs are filled with useful instructions.

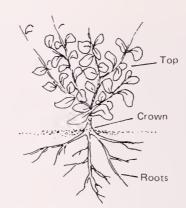
For our convenience in collecting the plants and getting them into the ground let's think of them in groups: garden dug plants and container grown plants first (since we may be planting these now, in midsummer), then seeds and dormant plants, which are ordered for spring planting.

Some treasures in our gardens are plants shared by gardening friends. Once you have caught the gardening bug, you may find a handsome clump of your mother's neighbor's iris at your back door or a newspaper-wrapped package of white violet plants on your office desk.

When I am offered a piece of a plant I would like to own I usually volunteer to get the shovel. I subscribe to the theory that "now" is the right time of year. I note or ask about the plant's present growing conditions, and the name of my new division (or part of the original plant complete with roots), and I write it down, knowing that I won't remember.

getting the plant into the ground

As soon as the plant gets to my house I cut back about one half of the top, unless it is very early spring. Any flowers go on the dining room table, and the new plant is relieved of excess foliage it cannot support. Then I wrap its roots firmly in newspaper or plastic, leaving the top sticking out. I water it



Placing the plant in the soil.

well and put it outside in the shade.

I would like to replant my new treasure the same day it was dug, but it doesn't always happen. A plant may have to wait for a few days or even a week as I have described. They must never be allowed to dry out. While the plant waits, wrapped, watered and shaded, choose a new home for it, mindful of its growing and light requirements and of your garden scheme.

Dig a hole larger and deeper than your new plant. Refill the hole with good soil; set the plant, holding its top in one hand and firming the soil under and around it with your other hand. Keep the crown (the place where the

top and roots meet — see illustration) slightly above ground level. When the plant is set, and before all the soil has been replaced, fill the planting hole with water several times and let it drain, then finish filling the hole with soil. Firm the soil around the plant with your foot, then water it again. A division or transplant is a mature, wellrooted plant. It must be in firm contact with the surrounding soil. Flooding the planting hole and tramping the soil are important steps in establishing the plant successfully in your garden. Recently moved plants require additional watering until they have regrown lost roots. Water at any sign of wilting.

Gift plants may also include gift weeds, which you will do well to remove from the clump before you replant it in your garden. Grasses and weeds with thick white roots are especially troublesome. There are also occasional gift insects. Careful inspection of new plants can avoid problems later.

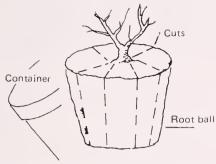
Container grown plants or plants in pots are available to buy and plant during the entire growing season, which is certainly an advantage. The disadvantage is that they are often irresistible impulse items. For example, a gardener might happily carry home an abelia with shining leaves and beguiling trumpet flowers on all its tips, and only later realize that it cannot be accommodated in his garden scheme.

Going plant shopping with a list, either of specific plants you want or of the locations you want to plant, is a wise move. If you need advice, shop at a nursery garden center where the

owner and employees have horticultural training, rather than at a supermarket or department store where you are on your own.

Container grown plants are often labeled with planting instructions as well as the plant's soil, light and space requirements. A few important bits of planting instruction may be missing for the novice. Most important—take the plant out of the container! You may laugh and say "I know that," but last spring I overheard a clerk assure a customer that her spiraea should be planted pot and all and that the pot would dissolve. The pot may eventually dissolve or rot but not until the plant is long dead and forgotten.

Another important missing instruction is to loosen the roots before planting. Root systems, grown in containers, are usually tight container-shaped lumps and will continue to grow in their old tight confines unless you take steps to prevent it. Take a sharp knife and make six or eight top-to-bottom vertical cuts about one inch deep, spaced around the root ball (see illustration). The cuts eliminate circling roots and promote growth of new feeder roots. After the pot has been removed and the roots loosened, follow the rest of the grower's instructions.



Cutting eliminates circling roots and promotes new feeder roots.

for planting.

Large container grown plants can wait for weeks or even months between purchase and planting if they are watered properly. Not so with the tiny ones. Annual flower and vegetable plants bought in market packs, or flimsy ice cube trays, are sold when they are ready to plant. They are very crowded in their tiny containers and apt to dry out several times a day. Buy these when you are ready to put them into the ground. Pop them out of their tiny pots, gently loosen their roots and plant them quickly. Water well at planting, and watch them carefully. They look sad and limp when they need water, but are quickly reestablished and growing.

Catalog shopping for bulbs, seeds and bare root plants is a favorite pasttime for many gardeners. Nursery catalogs are filled cover to cover with glowing descriptions, pictures, useful growing tips and remarkably low prices. We are tempted to go wild, selecting far more seeds and plants than we can grow.

seeds

How much seed is enough? The most difficult part of making a seed order is limiting yourself to what you can reasonably hope to plant. Limit the order a great deal further to what you can accommodate in your prepared garden space. Remember that all the plants that survive the vagaries of damp off, drought, dogs, bugs and neglect will require, within months of their germination, thousands of times the volume of space the innocent seeds required.

In the face of this greentide you can be very picky. Eliminate any vegetable you don't enjoy eating, and skip anything that sounds doubtful in our climate. Consider buying plants of peppers and tomatoes if you have no indoor growing space. Choose your seed for success. If you are a beginner, stick to annuals, and buy a few pots of perennial herbs. A good vigorous pot of thyme costs the same as a package of seed.

Having ordered seed, read the planting instructions and follow them. Please continued



Leftover seed can be saved for another year or planted, grown and plowed under for green manure.



On the left, two hundred feet of hardy orange hedging, *Poncirus trifoliata* seedlings. On the right, a two year old *Viburnum carlesii*.

take the advice of the seed producer who knows his product and wants you to have every possible success growing it.

Many seed packets tell us that the seed may be planted indoors six weeks before the last frost date. But, consider such an early start with care. The seedlings will need very good light to amount to anything. They need daily checking for water and they will probably need to be transplanted, occupying considerably more space before they can go out into the garden.

Time spent worrying over seedlings is better spent in the garden working up the soil or building a small nursery bed. It is easiest to wait until mid-May or early June and plant outside.

Now in midsummer with loads of seeds left over you have two chances to recoup. Many seeds remain viable for several years. (See March 1980 *Green Scene.*) If you do save seed, remember to look through it when you make your 1981 order.

Or if you don't want to save leftover seed for next year, mix all the seed together—flowers, vegetables, pumpkins and delphiniums, and broadcast the seed on newly dug garden areas. The resulting cover crop or green manure can be turned into the soil in winter or early spring.

bare root

Catalog shopping for bare root nursery stock is done in winter for delivery in early spring. Shipped leafless (dormant) with all the soil washed from the roots, bare root plants are lightweight and easy to handle.

Mail order nurseries include instructions with your shipment. Follow their directions for cutting back and planting. They will also include suggestions for keeping the plants in good condition if planting must be delayed.

Before ordering bare root plants, prepare garden beds and tree pits in the fall. Then order only what you are ready to plant. It is often not possible to dig a strawberry bed or holes for fruit trees in early spring. March snow turns to April rain and strawberry plants turn to mush in the package.

Fences for espalier fruit trees or arbors for grapes should also be made in advance. Bare roots can be arranged in the planting hole to stradle a post or have a flat side against a wall. A support installed after planting will cause root disturbance and damage.

Filling an area with growing plants is easy. Nature will do that for us—unassisted. Gardening, on the other hand is planned and controlled by the gardener, to create a desired effect or to provide desired produce.

Your garden is a reflection of the thought and care you have put into it.

Jane Lennon had plenty of experience getting plants and getting them into the ground. Retired from the Philadelphia Green program, she is developing her own new garden in Philadelphia.



City Gardening

by Libby J. Goldstein



A party begins near the compost bin at the Demonstration Garden at 3rd and Christian Streets.

Starting a new garden in the city is first and foremost an exercise in self-control. I have started one backyard and two community gardens in Queen Village, and one of these days I shall be getting round to my second backyard. Since I have owned the second backyard for several years now, one might conclude that I have finally learned to defer my gardening gratification. Not so. Everytime I read a new catalog, I still want everything—this week.

photo supplied by author

I have been held back from overplanting my new sun-filled 16 ft. x 36 ft. yard extension by logistics and economics. The original backyard came with a fence. It was cunningly constructed of 1 in. x 12 in. boards nailed to alternate sides of 2 in. x 4 in. stringers to permit free air passage, but not enough to keep my grapes from an annual attack of powdery mildew. More wonderful yet, not only could every kid in the neighborhood climb the fence using the stringers as steps, I could too and have on several occasions. Not the best sort of urban design, but it has had one positive outcome. I am the proud owner of a six-foot step ladder, which was left in the yard by some local burglars. They were apparently deterred from their rounds by dog or neighbors. I got to keep the ladder.

The new yard presents a smooth fence face to the street, but I had to wait forever for our local craftsman to

construct its crookedness, and the gate barely opens. He did, at long last, manage to install the 4 in. x 4 in. cedar posts between my yard and my neighbors' so that I may actually have some support for the grape vines and berries or espaliered fruit trees I planned for food and privacy. Of course, the posts went in right over an old foundation—increasing labor costs enormously. When possible, avoid property lines. They tend to have walls under them.

Air circulation actually doesn't seem to have been much of a problem. Although in a neighborhood with three-and four-story houses and brick walls it could well be. The problem is soil, of which there isn't any to speak of. I know one family who had a double lot

continued

('ily Gardening continued

on which they built garden and house. They actually excavated the entire garden site to remove all of the structures under it and refilled the hole with clean fill covered with imported "top soil." Such a program is totally beyond my means, but if you can afford it, it should obviously be done before erecting your fence.

My plan for the original backyard included dwarf fruit trees, the grape vines, some blueberry bushes, as well as some ornamental shrubbery for the sunnier parts and wildlings for shade and as ground cover. Because such a strangeness depended primarily upon transplants, I brought in no top soil. There was no way of dumping it over the fence in any case, Instead, I bought bales of peat humus, rock minerals, and composted manure. I then conned one of my neighbors, who was into neighborhood archeology, into helping me dig three-foot deep holes all round the perimeter of the yard where there is sun from February to September.

When planting time came, I simply filled the holes with a mixture of excavated fill, the peat humus and the fertilizers. The herbaceous materials also got very large holes filled with the same soil mix. Yearly mulching with everything from weeds, kitchen wastes and used holiday greens to bagged mulches of various sorts has increased my soil depth and tilth most satisfactorily. So has the large dog who lives here.

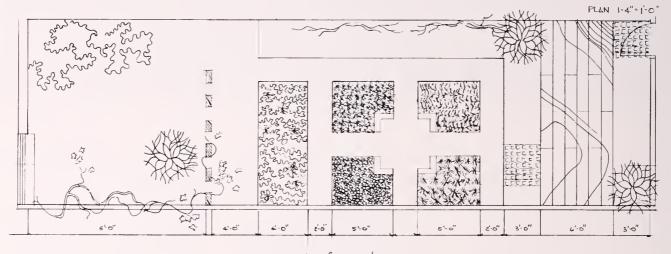
an error

I did make one error in soil preparation. I never had a soil test made. My assumption that peat humus, cotton seed meal and the natural acid rain we are all heir to would support a lot of acid-lovers was wrong. The side of the garden where I planted blueberries, some roses and a rhododendron is, luckily, O.K. The other side, not six feet away, is fine for sweet woodruff (Galium odoratum), assorted spring bulbs and a Geranium maculatum or two, but all sorts of acid-loving plants

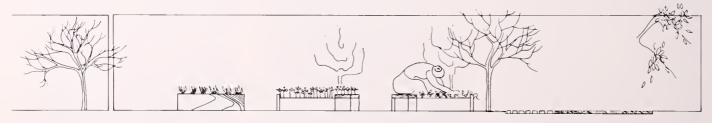
have expired there; too many bricks and too much mortar, no doubt.

My plan for the new yard is somewhat less labor intensive. (One can only fool local archeologists once—especially as we are all seven years older now.) Assuming that the contractor who is working across the street is still saving his old 3 in. x 12 in. joist boards for me, I intend to use them to construct raised beds and a sitting space (at grade).

The difference in methodology is not just based on aging. The original backyard was a backyard and consisted mostly of some sort of soil. (A concrete pad buried in its middle is now covered with pebbles, three rocks from a cellar on Fulton Street and dwarf bamboo, creating a faintly Asian effect.) The new backyard was primarily a house. Thus, the kind of hand excavation we did for the trees, vines and shrubs would be virtually impossible. I will loosen up the material under the proposed beds with my trusty pick, but the beds with their made soil will be



Plan for garden



Side view of proposed garden

SECTION AA' SCALE 12"1"-0"



Alpine strawberries (Fragaria vesca) in the window box and the kettle on the ground. A juniper (Juniperus horizontalis 'Bar Harbor') shares the box. Against the wall is an early flowering hybrid lilac bush; in the small box on the ground, Chrysanthemum × morifolium.

the primary growth space. The "soil" in this case will probably be a mixture of Fairmount Park compost and manure from my neighbor Mr. Hick's, stable. I should love to use spent mushroom compost, which we've used most successfully in community gardens, but there is no way to get a dump tractor trailer into Little Kauffman Street, an alley really. (Perhaps I could borrow a pick-up truck and drive down to Chester County . . .) In the meantime, I have been composting and green manuring with buckwheat and leftover seeds of all kinds from soybeans to black radishes and have been encouraging the large, worm-free dog with whom I share house and garden to join me in preliminary soil preparation.

how to find the right spot to plant in a city yard

Every gardening book you read will encourage you to make a sun and shade chart of your garden so you can tell what to plant where, but if you are gardening in the city, and particularly if your proposed garden is to be on a vacant lot, a structure and fill plan is also most helpful. Wait a few days after the next rain so the land can be dug, then take a shovel or a pick and make holes every foot or so. You'll get a picture of where the foundations are and of other underground structures. If

you can get down a foot, plan to plant there.

I really thought I had done super well with my sun and shade charts 'til last year when my Spitzenburg apple finally set fruit. By the time the fruit was large enough to begin its final ripening there was no more sun in the yard, and the fruit never did color up or ripen properly. Had I been more concerned with fall sun and less with having a historic cultivar, I'd have been much happier. As it was, the house finch flock had a good feed even though I didn't.

The original yard came equipped with a dusk to dawn spotlight and a water bibb thoughtfully provided by the developer. (He also laid an exposed aggregate patio without consulting me—and removed it as soon as I got my mortgage commitment.) In any case, I didn't have to worry about lighting and water. A longer hose will reach the new garden. Luckily, my original pebble path runs almost directly from the bibb to the place where we opened the fence to the new garden so I shan't be crushing plants everytime I water.

One could, however, plant some piping with the occasional bibb to facilitate overhead or drip irrigation schemes. Again, all of this must be thought through before the garden becomes

more than a collection of graph papers with weird curves and lines all over them. And you'll need to decide whether you're going to want a pool of some sort. I have worries about small persons lying face down and drowning in six inches or a foot of water everytime I think pool, but some people are more sanguine. If you do want a pool, it can, of course, be filled with a hose. You may, however, want to fill it from underground, and if you want a fountain or waterfall, you'll need electricity, too.

I have, , discussed electrifying my second yard with the local craftsman. I have no intention of digging up the first one to lay conduit into the second one. So he had to deal with that. He suggested a special outdoor outlet on the rear wall of the house from which I could string wire along the fence and into the new yard. An underground conduit with outlets where you plan to have lights and fountains and hot frames would be more pleasing to the eye, if not the

Not the best sort of urban design, but it has had one positive outcome. I am the proud owner of a six-foot step ladder, which was left in the yard by some local burglars.

back or checkbook, but one lives with one's decisions—and one's means.

Finally, I do plan to have what my mother calls "a place to sit" in the new yard. Actually, we sit on the front steps on our block. The backyard is for gardening, the occasional barbecue or the car. It's much friendlier. We can watch the happenings and mishappenings, and most especially, we can keep up with the news. However, the stoop is not for sunbathing. If you don't get your tan working in the community garden, you're supposed to go to the shore or fishing or something. My "place to sit" will be for sunning, even if it is in full view of the apartment house that looms to the north. I shall still be able to Ioll in my DR (Design Research) beach chair and read over a

22

long weekend. Who needs an all-over tan anyway? Besides, it will be nice to have a place to grill ribs outdoors. The last time I did them in the oven I had to adjourn my guests to the front steps while I cleared the smoke out of the house.

other city options and problems

Since I spent my early years as a

Queen Village gardener with a supersmall garden and lots of shade, I've done most of my edible gardening at the Southwark/Queen Village Community Garden. I've also done quite a lot of container gardening on the sidewalk on the sunny south side of the house, in the yard extension and under lights in the cellar. I've even tried an herb patch under my street tree.

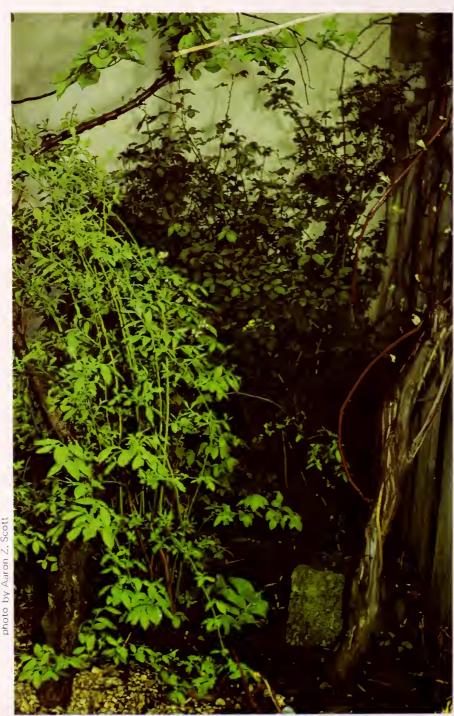
The main problem with community gardening in Philadelphia is the lack of permanence. Our first garden lasted one year. The owner had undisclosed development plans. We may or may not be able to acquire the present site. We've spent four years on soil improvement, planted an orchard and large parts of our souls in it. And the friendships and sense of community forged there are vital to us as individuals and as a neighborhood. The thought of losing it is really traumatic.

On the other hand, containers by their very nature are impermanent. I've had one or two containers walk up the street to the vacant lot-undamaged. They had old mop and broom handles in them as tomato stakes. I hadn't listened to my friend Johnny Davis when he warned me that the handles would be coveted by boys playing "Super-heroes." Containers with plain lath supports stayed where they were planted. So did a large iron wash tub. It was too heavy to move.

But the real preserver of containers on my sidewalk is history. One of the best container gardeners in the neighborhood, Minnie Townes, lived in my house before it was rehabilitated, and she always had a garden on the sidewalk, too. I was just continuing a tradition. I also continued the tradition of popping out the front door or upstairs window and yelling a lot at any untoward behavior.

Even yelling, unfortunately, does not help a planting under a street tree if the planting is at grade or unfenced. Kids, pedestrians and assorted beasts combine to assure a slow death. It works really well, however, if you lay one or two courses of bricks or Belgian block around the planting hole. Beasts are undeterred, but runners, walkers, bikers and skate boarders do stop. If they don't fall into your planting too often, you can be fairly well assured of

success as long as you remember to water and feed everything regularly. But you have to do that in the suburbs, too. Libby J. Goldstein is a South Philadelphia gardener who coordinates The Pennsylvania State University/Cooperative Extension Service Urban Gardening Program, writes the "City Gardener" column for the Philadelphia Daily News and now has an experimental mushroom farm growing in her guest room.



On the right, golden muscat grapevine; rose bush 'Betty Prior'; left foreground, blueberry bush, an unnamed cultivar from New England.

Chemicals for the Concerned Gardener





As I started planning our garden this year, I was reminded of the recommendation in *Farmer's and Gardener's Manual* of 1869 that we apply in the fall as much horse manure per acre as we can hire a man to haul and spread for \$200, at least 100 cartloads. This corresponds to three to five "cartloads" for a small backyard garden.

Since I devoted much of my working life to organic chemistry, I should be a strong proponent of organic gardening. I am, in fact, convinced that organic matter does wonders for the vegetable garden. Even manure can be overdone, however. Year after year of horse manure or some other good fertilizer can result in a nutrient imbalance. To correct a particular imbalance in our garden required a shocking amount of the non-organic cathartic, Epsom salts. I'll urge that you ask the State Extension Service to analyze your soil (see list on page 27), and then, deviating from the organic gardening gospel, follow the Service's recommendations for adding the proper nutrients. This service is more of a bargain than the 1869 cartload of manure.

weeds

A high proportion of beginning gardeners fall by the wayside when weeds take over. A fertile, productive garden soil will support a great crop of weeds. No matter how it is done the fight against weeds is the most irksome task of the gardener. Planting, harvesting, and even the game of controlling pests can be interesting, but weeding and hoeing have little to recommend them.

After the first flush of weeds is eliminated in our garden and most of the plants are growing, we use a newspaper mulch. I've tried different mulches, but always come back to a good layer of newspapers between rows overlaid with grass, straw, hay, compost, or even old manure. Black plastic is fine in certain places, but for the garden in general it results in a serious disposal problem. Newspapers can be plowed or spaded in at the season's end, they

stop weeds better than a hay or straw mulch, and mulching is a good way to recycle old newspapers.

Proper use of herbicides might provide a solution to the weed problem in the home garden. However, this would require considerable knowledge of herbicides and their use, as well as the ability to control very accurately their application. Furthermore there is as yet only one herbicide, Dacthal, approved for use in the home vegetable garden.

Dacthal is a preemergence herbicide. It prevents sprouting of seeds, hopefully only weed seeds. It is not likely to damage established plants, but recommended timing of application should be carefully followed for each drop to avoid interference with sprouting of vegetable or flower seeds or injury to especially sensitive crops.

The most persistent hot-weather weed in our garden is purslane. It is "a pleasant salad herb" very high in vitamin C, according to the Nichols Garden Nursery where you can buy seeds. We have never been able to eat more than a miniscule fraction of the purslane we grow. If hoed and chopped up, pieces of purslane left lying on the ground will take root again. Dacthal will not prevent this rooting, but it will control

purslane quite well if application is timed properly (before the seeds sprout).

insects

Once the gardener has attained sufficient weed control to continue interest in gardening, the next problem is insect damage. This is much more of a problem than it used to be before widespread fear of chemicals. I'm all for preventing injury to people, protecting the environment, and keeping children out of the poisons, but rational activity is very much hampered by the paranoia that publicity about chemicals has created.

In dealing with pest problems in a large garden during the past 40 years, we have used all possible approaches. including some of those recommended by the organic gardeners and some using synthetic chemicals. The prevalence of pests and diseases varies widely from one garden to another and from one year to another, depending on such factors as weather, type and abundance of weeds in the area, type of soil, or proximity of large farm crops. For example, we have not yet found it necessary to use pest control chemicals on our corn. Corn pests have needed control in many gardens. Likewise we have not yet encountered





Whitefly - adult, eggs and nymphs.

Chemicals continued

trouble with the whitefly that worries so many gardeners.

Every serious gardener should use a hand magnifying glass and learn to identify common garden pests and their eggs and offspring. This is the first step in what is widely promoted as "Integrated Pest Management (IPM)." Although I think there are some striking exceptions, it is generally tolerable to wait until insect damage becomes apparent before using pesticides.

Any practice that impedes the welfare of pests should be followed. One such fundamental practice is rotation of crops in the garden. That may be difficult in a small garden and of limited effectiveness. We are able to divide our vegetable garden into four sections, and move each group of plants into another quarter of the garden every year. Any one type of crop is then planted in any one place every four years. In small gardens it may only be practical to change crops every other year, but even that is worthwhile.

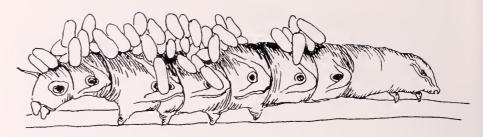
There are other techniques recommended by the organic gardeners to discourage pests, and they are worth learning about. For example, the time of planting some vegetables is important in controlling pests. Some few principles of companion planting may be effective, but I fear this practice has resulted in more hopes than accomplishments.

predators

Use of pest predators is another tactic that is widely recommended. Few solid accomplishments in this field are yet available to the home

In 1938 the onion maggot was controlled by pouring around each plant a cup of mercuric chloride solution. This would drive a modern environmentalist up the wall.

vegetable gardener. I have not found it possible to depend on ladybugs or praying mantis for control of insects I worry about. Some wasps do help control insects, and I understand a promising predator of the bean beetle is under study. The big tomato horn worm is often controlled by a wasp along with some hand picking. This may be about the only case where hand picking of insects is worth the time of a busy gardener. You have to



Tomato horn worm. Wasp eggs will hatch on its back.

look sharply for these big camouflaged worms to find them before they do considerable damage. When you see a horn worm covered with white eggs, let it live to nourish a brood of wasps that should hatch out of those eggs.

There are some fundamental problems in the use of predator organisms to control your pests. First, the foreign predators are likely to be choosy in their diet, and it is necessary to fit the predator to the pest. Second, there must be a good commercial source for each type of predator. Third, a balance is necessary between each predator and its pest. If there are not enough pests, the predators will disappear. One study of mite predators suggested that a resident entomologist might be desirable to keep things in balance. And finally, the use of chemical controls is not compatible with the use of predators. As a matter of fact, however, tiny lizards (newts), tree frogs and spiders of many types have presisted in my greenhouses in spite of the occasional use of pesticides.

Plant breeding has provided the gardener with many new vegetable varieties that are resistant to pests and diseases. Cultivation of these resistant varieties has substantially reduced the need for fungicidal chemicals. Fungicides have generally a much lower mammalian toxicity than insecticides, however, and their use entails a minimum of hazards. For example, the fungicide Manzate shows in animal tests an acute oral toxicity roughly half that of table salt. Benlate and captan are rated even less toxic than that.

One of the first pests encountered in our garden is the flea beetle. When a zinnia sprouts and sends up two cotyledons, they often soon disappear. Unless you watch carefully and find that these tiny leaves are eaten by flea beetles, you might think the zinnias

never did sprout. As soon as the cotyledons first appear I dust them with methoxychlor or Sevin. Flea beetles are damaging to many young plants.

Chemical Controls

We have never been able to grow cucurbits without aggressive use of chemicals. Early zucchini, especially the very early plants grown in tubs, often avoid trouble, but cucumbers, melons, and later squashes require defense. Fungi and borers cause trouble, but most alarming is the sudden death of a whole cucumber or melon vine from bacterial blight, which the cucumber beetle carries and injects. To prevent the blight, the beetle must be controlled. I challenge the pleas of Integrated Pest Managers to wait until you see the whites of their eyes. Use of insecticides from the start of growth is necessary in many gardens for success with cucumbers and melons. I prefer a hand duster and a vegetable dust like Agway's containing methoxychlor.

Dusting may not be as effective as spraying, but it is easier and less time-consuming because the duster is ready at all times and does not have to be washed out after each use. Dusting in the evening avoids as much as possible injury to pollinating insects, because the flowers are usually closed up at that time. More care to prevent inhalation of the chemical is necessary with dusting than with spraying.

The bean beetle appears as ubiquitous as any garden pest. We make six successive plantings of snap beans, and they all require protection. Rotenone used to be the classic insecticide for bean beetles. It is one of the few insecticides approved by the organic gardeners because it is considered "natural." However, in animal tests it is almost twice as toxic as diazinon and 40 times as toxic as methoxychlor. Rotenone is

also more toxic when inhaled and causes liver and kidney damage. I am sure rotenone can be used safely by an intelligent gardener who can refrain from eating it or breathing the dust. I've made these toxicity comparisons to illustrate the inconsistency of a common attitude that "natural" materials are safe in contrast to synthetic chemicals.

We have needed protection for onions and leeks against the maggot in our garden. Right after putting in either seeds, or sets, or tiny plants, I go down the row with a sprinkling can and drench the soil with a dispersion of diazinon. Additional treatments are usually recommended, but I have found the one initial drenching quite effective in reducing damage by the maggot. This same treatment for root maggots can be used on radishes and brassicas.

For proof that we have come a long way, please note the recommendation in USDA Farmer's Bulletin No. 1746 of 1938 that the onion maggot is controlled by pouring around each plant a cup of mercuric chloride solution. This would drive a modern environmentalist up the wall.

Also ubiquitous is the cabbage worm on brassicas (mustard). The most conservative treatment here is, I think, Bacillus thuringiensis, sold under the trade names Dipel and Thuricide. This is a disease organism that gives the worms stomach trouble. The Merck Index says it is "non-toxic to humans and animals," which is a strong statement.

The whitefly has become troublesome in outdoor gardens recently. Whiteflies should not withstand winter temperatures in our climate, but they can be carried over in homes and greenhouses. Three methods of control have been recommended: (1) Use a vacuum cleaner several times per day to suck off the adults as soon as they are ready to lay eggs on houseplants. Continue until all eggs have hatched and yielded adults. (2) Cover bright orange colored boards with a sticky surface and hang near the plants to attract and entrap the adults before they lay eggs. (3) For outdoors, spray a synthetic chemical, Resmethrin, or related compounds recently introduced; this is a more practical attack. These newer whitefly sprays have not yet been approved for

use on vegetables.

Mites have not been a serious problem for us in the vegetable garden. However, they can cause trouble in the greenhouse and may be very worrisome in house plants. If there are silvery spots on the leaves, look underneath with your magnifying glass. The spidermite with eight legs belongs to a different class (arachnida) from the insect with six legs (hexapoda), and is best controlled with different pesticides. Mites adapt to frequently used pesticides and become tolerant. Insecticides like malathion are "labeled for" spidermites, but have in most cases become ineffective. Miticides such as Kelthane or Pentac give better control.

In recent years, new insecticides have been brought out that offer the home gardener better control of some pests. Pirimor and Orthene are examples. Pirimore controls aphids surprisingly well. Orthene controls a broader range of insects, but has particular advantage for use against sucking insects like scale and mealy bug because of its systemic action and persistence. Orthene has a skunky odor that some people resent, but it is not very apparent after dissolution and application. Neither of these insecticides is yet approved for use on edible crops.

infections

Viral infection of vegetable plants, especially tomatoes, peppers, and



Aphids

potatoes is quite common. No pest control agent known at present will cure virus in a diseased plant. The only defense is preventive measures. Virus can be transmitted from one plant to another by insects and by human hands. Infected field weeds are a common source. Tobacco mosaic virus is said to be present often enough in cigarettes to be a likely source of the disease in garden plants. After handling tobacco products, it has been suggested that the hands be washed with milk before handling garden plants like tomatoes. Milk is apparently not a true viruscide but may have a retardant action. A flame is the most dependable disinfectant for plant viruses on cutting tools. It is doubtful whether the compost heap as commonly managed, will heat up enough to kill plant diseases.

parts per trillion

Spectacular advances in analytical chemistry provide detection of such minute quantities of pesticides that we should begin to wonder how much is none. It is difficult to appreciate the magnitude of "parts per billion" or "parts per trillion" of a toxicant, which are often seen in the news. Perhaps we can better understand these terms when applied to the concentration of some common toxicants we encounter every day. For example, there are more than 20,000,000 parts per billion of nicotine in tobacco, and nicotine is much more toxic than any of the synthetic pesticides now available to the gardener. Purchase of nicotine for garden use requires a pesticide use license which you must earn by passing an examination on the proper handling of pesticides. There are about 500,000 parts per billion of caffein in a cup of tea. Caffein, even though "natural" has a greater acute oral toxicity in animal tests than the insecticide diazinon or the herbicide 2-4-D and 30 times the toxicity of methoxychlor.

Highly toxic chemicals (deadly, to use the language of headlines) found naturally in common foods and condiments might, if expressed in parts per trillion, make you wonder if eating is a good thing. (See *Toxicants Occuring Naturally in Foods*, Publication No. 73: 8968 by National Academy of Science.) Food plants did not evolve to feed humans, and their "natural" toxins are as likely to injure humans as synthetic

Chemicals continued

chemicals, which have been carefully tested and selected for lowest possible mammalian toxicity.

The table accompanying this article compares acute oral toxicity in rats for a variety of toxic materials. This is not, of course, the only type of toxicity. There are also tests for carcinogenesis, birth defects, and mutation effects, for example, some controversial and some hard to interpret. Chronic damage from contact with less than lethal quantities of a material over a long period of time must also be considered. Daily use of what some people call a normal amount of table salt can result in very serious ailments and death. Frequent exposure to a pesticide over a long period may in some cases result in a much greater hazard than indicated by the acute oral toxicity. Such chronic effects need not be of concern to the home gardener who is an infrequent user of the recommended pesticides that are soon degraded by sun, air, moisture, and soil action.

The acute oral toxicity in rats is the simplest direct measure of toxicity, and is the basis for many of the government regulations on pesticides. It is indeed a better guide than the often imagined association of chemicals with common human ailments like headaches, arthritic pains, miscarriages, and neoplasms. Any of these ailments might be caused by poor diet, bad habits, and excesses of humans (which are rare in rats).

The LD-50 figure is the lowest amount of a toxicant (in milligrams per kilo of body weight), which in a single dose will kill 50% of the test rats. Toxicants in the table are listed in

descending order of toxicity (the lower the LD-50 the more toxic).

Some insecticides are much more toxic to people with a defective liver. Therefore, if you indulge in habits that are injurious to the liver, you should lower the LD-50 for pesticides like malathion by one or two orders of magnitude.

A final warning: To be consistent

with U.S. government pesticide regulations, you should, by all means, keep tea, coffee, and cola drinks containing caffein and also chocolate products that contain the toxic theobromine out of the reach of children.

•

M. M. Brubaker is a frequent *Green Scene* contributor.

ACUTE ORAL TOXICITY IN RATS (LD-50*)

(number is mg./kilo of body weight)

	AUTHORI'	TY
Merck Index	Univ. of Penn.	"Toxic Substance List" U.S. HE&W
50-60	50-60	55
133	132	132
	157	157
180		180
200		192
		200 (in cats)
	300	
	200-2600	
500-700	400	388
610		610
700	866	
	1200	
1495	809	684
1750		1500
1000-1370	1375	1156
		1580
	1500	
		1660
Over 3000	Over 3000	
3750		3000
	3160	
6000	6000	5000
	6750	
	Over 9000	
Over 15,000	10,000	
	50-60 133 180 200 500-700 610 700 1495 1750 1000-1370 Over 3000 3750 6000	Merck Index Univ. of Penn. 50-60 50-60 133 132 157 180 200 300 200-2600 400 610 700 866 1200 1495 809 1750 1000-1370 1375 1500 Over 3000 3750 6000 6000 6750 Over 9000 Over 9000

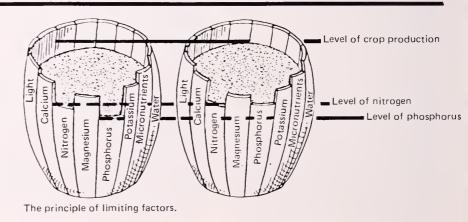
I = Insecticide; H = Herbicide; M = Miticide; F = Fungicide

Garden Soil



A favorable combination of soil, light, air, water, temperature and nutrients is essential to the growth of plants. Any one of these factors, out of balance with the others, can reduce or even entirely inhibit the growth of plants. Thus, the weakest factor determines the level of plant growth.

We must be concerned not only with the supply of a given nutrient, but also with its supply in relation to all the plant nutrients as well as the other environmental factors.



continued

^{*}The LD-50 is the lowest amount of a toxic substance (in mg/kilo of body weight) needed in a single dose to kill 50% of the rats in a given test. For example, it takes 50-60 mg/kilo of body weight of nicotine to kill 50% of the rats in a study, whereas it took more than 15,000 mg/kilo of body weight of Captan to kill 50% of the rats in a study.

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Garden Soil

continued

For example, in the diagrams pictured here, the level of water in the barrels represents the level of crop production. On the left, phosphorus is represented as being the most limiting factor. Even though the other elements are present in more adequate amounts, crop production can be no higher than that allowed by the phosphorus. When phosphorus is added (right) the level of crop production is raised until it is controlled by the next limiting factor, in this case nitrogen.

An adequate knowledge of garden soils and how to manage them is necessary for a productive garden. Ideal garden soil is fertile, deep, friable, well-drained, and high in organic matter. Heavy clay soils are late in drying out and are difficult to cultivate and work properly. Extremely sandy soils may lack organic matter and may dry out too rapidly between water applications. The best soil is between these two extremes. The exact type of soil, however, is not too important if it is well-drained, adequately supplied with organic matter, and retains moisture.

soil testing

The more intensive the gardening, the more important is the information provided by a soil test. The test also is valuable to people planting a garden for the first time and who don't know how the soil was treated in the past. The Pennsylvania State University Soil and Forage Testing Laboratory analyzes all samples for soil pH, calcium, magnesium, potassium, and phosphorus and recommends the appropriate nutrients based on plant needs in that soil. of important plant nutrients and nutrient balance status of the soil.

You can obtain a soil test mailing kit for garden soils from your county agricultural agent for \$3.00. There's no additional charge for analyses. An information sheet with each mailing kit if completed will enable us to recommend appropriate levels of lime and fertilizers.

Richard A. Bailey is the director for the Bucks County Extension Service.

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COUNTY	AGENT	ADDRESS	PHONE					
Philadelphia								
Bucks	Richard A. Bailey	Neshaminy Manor Center Doylestown, PA 18901	215-DI 3-2800					
Chester	Robert A. Powers, Jr.	235 W. Market St. West Chester, PA 19380	215-696-3500					
Delaware	James J. McKeehen	Toal Bldg. 2nd & Orange Sts. Media, PA 19063	215-891-2491					
Montgomery	Paul Reber	400 Markley St. Norristown, PA 19401	215-277-0574					
Philadelphia	William H. White	S.E. Cor. Broad & Grange Sts. Philadelphia, PA 19141	215-HA 4-0650					
	1	lew Jersey						
Burlington	Richard L. Washer	County Office Bldg. 49 Rancocas Rd. Mt. Holly, NJ 08060	609-267-3300					
Camden	Robert G. Ruizzo	County Ext. Serv. Bldg. 152 Ohio Ave. Clementon, NJ 08021	609-784-1001					
Gloucester	Raymond H. Battle	County Office Bldg. N. Delsea Dr. Clayton, NJ 08312	609-881-1200					
Mercer	Charles M. Holmes	930 Spruce St. Trenton, NJ 08638	609-396-4593					
Salem	M. A. Brace	County Adm. Bldg. 94 Market St. Salem, NJ 08079	609-935-1360					
		Delaware						
New Castle	David V. Tatnall	Univ. of Delaware Agricultural Hall Newark, DE 19711	302-738-2504					
Kent	David Woodward	Box 340 Dover, DE 19901	302-736-1448					
Sussex	William H. Henderson	R.D. 2, Box 48 Substation Bldg. Georgetown, DE 19947	302-856-2553					
		Maryland						
Anne Arundel	G. David Hitchcock	44 Calvert St. Annapolis, MD 21404	301-224-7111					
Baltimore	W. Max Buckel	9811 Van Buren La. Cockeysville, MD 21030	301-666-0445					
Carroll	Robert L. Jones	County Office Bldg. Annex 55 N. Court St. Westminster, MD 21157	301-848-4611					
Harford	Lynn T. Warman	33 Courtland St. Bel Air, MD 21014	301-838-6000					



An arborist moves skyward, not an activity for the home gardener.

Trees as Part of Your Gardening Plan

An arborist's work is not for the homeowner. A good arborist not only understands what needs to be done with trees and when it needs to be done, he or she must handle risks that lesser mortals gladly eschew.



by Jane Pepper

Two scarlet oaks, one sweet gum, one large hemlock, some white ash and an assortment of dogwood trees are among our best-loved "possessions." The oaks shield the front of the house from the western sun; the sweet gum provides shade for the terrace; the hemlock obscures the neighbor's house, and the dogwoods are beautiful 12 months a year.

The trees in your garden are irre-

placeable assets. A good sodding job can repair a lawn within 48 hours; a trip to the local garden store can help produce a gorgeous flower garden within a few weeks. Mature trees, on the other hand, cannot be purchased at any price. Even if you plant a large and expensive tree it may be 30 or 40 years before it will give you the shade you need.

Such an asset deserves care and attention and a long-range plan. It also may entail considerable expense, so it pays to learn as much as you can about your trees and their needs. If you are well informed, you have a better chance of getting good value for the money you invest to keep this asset viable.

starting with the architect

Let's start with a hypothetical couple who purchase a lot and employ an architect to build the dream house they want. Before the architect gets too far into planning, this couple should seek the assistance of an arborist or a landscape architect with a good background in trees to assess the potential of the existing trees on the property. Fast-growing trees such as ailanthus, poplars and silver maples with short

lifespans may be chain saw candidates. On the other hand, if they provide the only shade on the lot, they may be valuable. Often the location of the house can be adjusted to save some of the better trees-if the architect and the arborist are given a chance to work together from the start. Grade changes are especially hard on surface-rooted trees such as tulip, beech and hemlock. If the grade has to be changed to accommodate the house, it's often possible to save valuable trees by constructing tree wells with terra cotta drains to irrigate and aerate the root systems. Bulldozers and backhoes can do enormous damage to fragile root systems. An experienced arborist or landscape architect might make specific suggestions as to which areas should be dug by hand to preserve a tree's root system. The added expense may save a large shade tree, which will in years to come substantially reduce the family cooling bill.

remodeling

Most of us are faced not with the vacant lot but with a house set in an established landscape. Financially the

prospect of caring for the trees may be daunting. Most homeowners can handle small pruning jobs. Few have the time, experience, equipment or inclination to tackle the larger trees. Before you plan any changes to your house you should first consider the trees. Maybe your roof is in sorry shape. Before you lay one new shingle, however, have the trees pruned around the house. Planning a greenhouse? Make sure the trees adjoining the site are free of deadwood.

Whether you have a new lot or an old house, your first challenge is to find a reliable arborist or tree surgeon. To get the right person takes time, but it's time well spent. Select a person with whom you can establish a long-term relationship—someone who will take a personal interest in your trees and make long-term recommendations so you can spread the expense out over the upcoming years.

For the most part you may find the extension service, the arboretums and even the Pennsylvania Horticultural Society reluctant to recommend arborists. Endorsement of a commercial operation or product is not in keeping with the goals of these organizations.

continued



Japanese maple

the green scene • july 1980

Trees continued

Your best source of information may be your friends and neighbors; failing that check the Yellow Pages under "Tree Service" to find a list of arborists in your area. Choose three or four companies and ask each one to give you an estimate. Get each arborist to establish a long-term plan for your property and then have them break it down into manageable annual chunks. Insist on receiving a written proposal for the planned work. Be sure to ask them for proof of full insurance coverage and, if you plan to do any pest control, make sure they are fully licensed to use restricted pesticides. Insurance coverage is especially important if you are dealing with a tree person who is moonlighting on evenings or weekends. While these people may be fully covered by their employer, they may not be covered as individuals.

Don't hesitate to ask for references and try to find out about their background and experience in the field. At present, unfortunately, there is no certification program for arborists in this area. Bill Graham, superintendent of grounds at the Morris Arboretum and president of the Penn-Del chapter of the International Society of Arboriculture, hopes their chapter will be able to introduce a certification program within the next couple of years.

As with any other estimates, you may find large price discrepancies. If one of the tree estimates is very low you should check into it carefully before you sign on the dotted line. Abnormally low estimates usually mean the operator plans to use low-grade chemicals or fertilizers; that he or she is a butcher as opposed to a pruner and may ruin the trees by pruning carelessly in a hurry; or that he or she is an inexperienced estimator and therefore may be an inexperienced arborist.

As with any other important work on your property, it's best to be on hand while your tree work is being done. One couple employed a reliable arborist who had worked for several of their friends. The couple discussed the proposed job between themselves and then, because of schedule conflicts, at separate times with the arborist neither husband nor wife was on hand when the work was done. Unfortunately, they were unpleasantly surprised when they came home and found



Bill Graham of Morris Arboretum makes going out on a limb real.

the arborist had misinterpreted their directions and removed several extra trees. As with many disasters, this was a clear case of poor communications. If at least one family member had been on hand while the arborist was at work, the problem could have been averted. As it is, the trees are gone and it's going to be several years before the gaps can be filled.

There are lots of excellent arborists in the Delaware Valley and most of them are eager to enter into mutually rewarding relationships with their clients. Repeat business is the lifeblood of a good arborist. Spend a little time to find the right one for your trees.

Pruning, fertilizing and pest control are the three tasks that will consume the bulk of your tree budget.

pruning

Ed Martin, arborist, Flourtown, Pennsylvania, maintains that trees can be pruned 12 months of the year. Paul McFarland, McFarland Arborist Services, Inc., Philadelphia, prefers to halt pruning between March 15 and early May when the sap is flowing. Time pressures often force McFarland to prune during these months but he prefers to concentrate on take-down work and storm damage until the sap hardens.

McFarland's regular customers request that their pruning be done in mid-winter. Arborists tend to work even in the meanest weather. High winds are probably their greatest deterrent. Several reasons make mid-winter an excellent time to prune: leafless branches are lighter to bring down and easier to clean up; the structure on a leafless tree is easily visible and the arborist can prune for aesthetic effect as well as the health of the tree; the ground is often frozen, which makes it possible to bring in heavy equipment with a minimum of damage to a lawn. If your goal is to open up vistas and

clear pathways, summer pruning and removal is probably more desirable because you can study the effects of the work as you progress.

Pruning your trees is like painting the Brooklyn Bridge. As soon as you get to one end, you must start all over again. Ernesta and Fred Ballard try to have their trees pruned on a six-year cycle, which is often enough to keep the trees free of excessive deadwood. They consider the annual pruning allowance worthwhile insurance and rarely have a garden littered with limbs after a storm.

fertilizing

Fertilization is an important part of your long-term tree care program. Paul McFarland says well fertilized trees "can more readily combat diseases and insect attacks."

Both Ed Martin and Paul McFarland agree that trees in open lawn areas should be fertilized once every other year. Trees in natural, wooded areas can fend for themselves, those in cities or restricted areas may require additional fertilizer. Tree fertilization is not a simple matter of adding an extra dose around the tree as you fertilize your lawn. On the contrary, you should avoid fertilizing trees in this manner because it encourages surface roots at the expense of deep, anchorage roots. Eventually these surface-rooted trees may topple over in high winds. Other methods, such as pressure injection get the fertilizer down into the root system.

Where possible, McFarland uses the pressure-injection method to get the paste fertilizer 18-24 in. down into the root system. McFarland says this system provides the roots with beneficial oxygen as well as fertilizer. Both McFarland and Martin stress the need to make sure your arborist uses an organic, slow-release fertilizer so its effects will be dispersed over a long period of time. Ed Martin uses the

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pressure injection method when the ground is soft. When it's frozen, his crew makes endless holes with a bar and places dry, granular fertilizer in each hole. Martin likes to fertilize heavily. An 18-in. (diameter at breast height) oak in his front yard receives about 150 pounds of fertilizer every other year. To distribute this fertilizer Martin may make as many as 200 holes 20 in. apart, covering the ground under the entire tree canopy. Each hole is 15-18 in. deep. Both arborists agreed that late fall is an excellent time to fertilize.

pesticide control

This topic is probably the most controversial matter you will discuss with your arborist. The amount of spraying you request will depend upon the state of your trees, on your attitudes towards pesticides, on your budget and how you will use the area beneath the trees. One friend has a garden surrounded by oaks, which are highly susceptible to aphids and scale. Both insects exude a sticky substance that coats the terrace, the outdoor furniture and the shrubs. In order to enjoy the garden this family must apply an insecticide to their oaks three times a year.

Books and pamphlets abound on the subject of the control of insects and diseases and this is no place to survey the literature. For the purposes of this article Paul McFarland divided the most common insect problems that affect Delaware Valley trees into three categories and listed them in descending order of importance.

- 1. A combination of *Fiorinia* hemlock scale (*Fiorinia extera*) and woolly aphids (*Adelges tsugae*) can kill hemlocks after three years of heavy infestation. Unfortunately this combination is moving into Douglas firs.
- 2. Scale primarily on oaks, also on maples and hickories.
- Birch leaf miner, holly leaf miner, gypsy moth, bagworms (especially in center city on maples and junipers) and spider mites.

One disease, anthracnose, is prevalent on sycamore trees in this area often causing them to defoliate in late spring. There is no effective control for anthracnose. If your sycamore is in the city or on a suburban lawn and therefore devoid of the benefits of forest life, Paul McFarland suggests you

fertilize the tree every year to help it put out new leaves following defoliation.

The control recommendations for these insects are complex and everchanging. If you wish to check on the recommendations made by your arborist I suggest you call your extension agent for the most up-to-date information.

trees in the city

City trees need special help, which is often hard to provide. It's almost impossible, for example, to fertilize a tree with a deep injection system if the trunk is surrounded by concrete or brick. McFarland stressed, however, that homeowners can help greatly by watering trees in dry periods.

City residents should also know that street trees belong not to the city but to the appropriate homeowner. A permit is required, however, before you touch any tree on the public right of way (sidewalk, lawnstrip). The fine for breaking this law is \$300. The reasons for requiring such a permit are twofold. First, where possible, the city government wishes to prevent careless removal of trees. Second, permits, although free, are only given to insured arborists. This permit protects not only the city trees but also the homeowner from liability suits. Although the city has jurisdiction over the trees, its funds for tree care are so limited that homeowners will probably end up paying for all tree work near their houses.

City and suburban tree owners should realize that they have air rights within the bounds of their property lines. Should the large sycamore on your neighbor's property lean into your yard, you have the right to remove that portion of the tree that infringes on your air rights. Be warned, however, not to remove one additional inch without checking with your neighbor.

As you can see from the perspectives of arborists Ed Martin and Paul McFarland, tree work like any other branch of horticulture is open to discussion. There are few absolute rules and regulations, and there are several different ways of achieving good results. There is one rule, however, which should apply to all of us. Our trees are a wonderful heritage. Let's make sure we pass them on to the next generation in good shape.

Jane Pepper is public information coordinator for PHS.



by Paula Singer

Stumped by Your Stumps?

The first house my parents owned was an old Scottish manse. The house was delightful but the front "lawn" was full of seedy trees and for the first couple of years my parents seemed to spend their weekends on either end of a large saw, Eventually my mother had her sunshine but she also had endless stumps. By then the children were old enough to lend a hand in the garden, and we were cajoled into drilling holes in the stumps with an auger. Into the holes my mother poured some dreaded concoction and returned to work on the rest of the garden. while she waited for the stumps to rot. Eventually some obliged. Others showed no signs of rotting and she eventually piled soil on top of the larger stumps and built several rock gardens, fondly known as the "dogs' graves" because of their bulging shapes.

Paul McFarland suggests a couple of ways to get rid of your stumps. The first is to ask your arborist to rent a stump grinder. Unless your property is extensive and you have several stumps to remove, this is often not practical. The grinder may cost the arborist \$250 per day on top of which you must pay the arborist and his crew. Often, even if you are prepared to foot the bill, the stumps are inaccessible to large machinery. In these situations, McFarland suggests you apply a strong dose of high nitrogen fertilizer to the stump. In the presence of the nitrogen the wood bacteria increase dramatically and hasten cellulose decay. For a 24-in. diameter stump McFarland suggests you use five pounds of 38-0-0. (This fertilizer may be hard to find. McFarland buys it from Borden Company, DuPont or Hercules Chemical Company.) You can lay the fertilizer on top of the stump. Alternatively, see if you can persuade your children to help you drill holes and pour the nitrogen into the stump. Once the wood starts to rot, chip the stump away with an axe.



tools

In the spring issue of Pacific Horticulture, editor W. George Waters wrote an article, "The Gentle Art of Digging," which amounted to a song of praise to the spade. Waters included an interesting observation made by a famous gardener: "We don't talk about digging anymore-only about cultivation." Waters noted that when talking about soil, cultivation means using machines with rotating blades and other powered tools, as well as digging with a spade. But, he feels, there is an important difference between the mechanical and the manual process. The spade reaches deeper, and he insists that the soil denied the spade is the poorer for it.

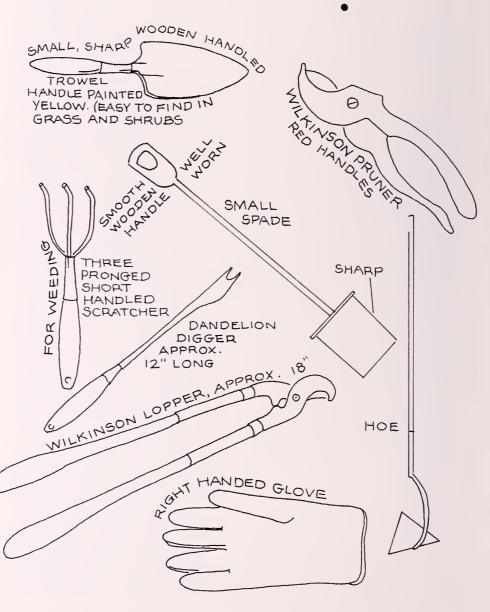
The key point in the article that drew our attention, however, was a paragraph that dwelt on the special affinity a gardener has for his or her tools. Fred Ballard discussed that special caring in "Tale of a Tool" (*Green Scene*, September, 1979).

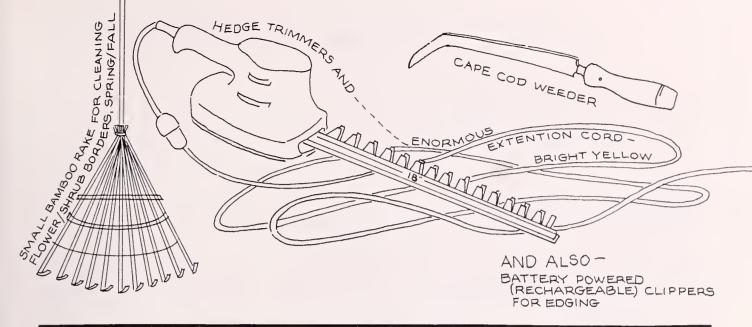
George Waters expresses that relationship in the following way:

"George Glenny, writing on gardening early in the nineteenth century, said, 'Never work with bad tools. The difference between the work done (with good and bad tools) in a month would buy a set of new ones.' There are so many bad tools offered that finding good ones may call for diligence. My first spade was quite ordinary; it was not highly priced and little was claimed for it by the makers. Nevertheless it served me well for thirty years and may be serving another still, for it was left behind in England, worn but undamaged. With it I had dug, and sometimes double-dug, many acres of ground. It survived misuse when tree stumps and large rocks were removed and endured occasional neglect when left overnight in the open. Once, when the shaft and handle seemed gray and rough, I brushed them with raw linseed oil to help make the wood smooth again; otherwise the spade had little care. I was fortunate to have come

upon so good a tool in my early gardening days. Over the years I grew fond of its sturdy hickory shaft and familiar handle worn to my grip. The blade, polished by rich greensand, hungry gravel and sticky marl, had the temper of a spring and rang like a bell when caught on a rock. It contributed to my pleasure in gardening; George Glenny understood that."

In this back to basics issue we wanted to include some information about tools, so we asked several staff members to recommend tools they find indispensable. We've shown them here. They are all available at garden centers. There are many more, so we'd like to hear from members about those less than ordinary tools that have become favorites.





basic gardening books

General

The Principles of Gardening, Hugh Johnson, Simon and Schuster, NY, 1979.

Taylor's Encyclopedia of Gardening, 4th ed., Norman Taylor, Houghton Mifflin, Boston, 1961.

Design

Homeowner's Guide to Landscaping That Saves Energy, Ruth S. Foster, McKay, NY, 1978.

How to Plan Your Own Home Landscape, Nelva M. Weber, Bobbs-Merrill, NY, 1976. New Budget Landscaping, Carlton B. Lees, Holt, Rinehart & Winston, NY, 1979. The Small Garden, John Brookes, Macmillan, NY, 1978.

Technique

The Complete Book of Growing Plants from Seed, Elda Haring, Hawthorn, NY, 1967. Diseases and Pests of Ornamental Plants, 5th ed., Pascal P. Pirone, Wiley and Sons, NY, 1978

How to Prune Almost Everything, John Philip Baumgardt, Barrows, NY, 1968. Pruning, Christopher Brickell, Simon and Schuster, NY, 1979. (RHS Step-by-Step Encyclopedia of Practical Gardening.)

Culture

Bulbs for the Home Gardener, Bebe Miles, Grosset & Dunlap, NY, 1976.

The Complete Book of Groundcovers, Robert E. Atkinson, David McKay, NY, 1970.

Crockett's Victory Garden, James Underwood Crockett, Little, Brown, Boston, 1977.

The Green Thumb Book of Fruit and Vegetable Gardening, George Abraham, Prentice-Hall, Englewood Cliffs, NJ, 1970.

Lawn Keeping, Robert W. Schery, Prentice-Hall, Englewood Cliffs, NJ, 1976. 100 Great Garden Plants, William H. Fred-

erick, Knopf, NY, 1975.

Rock Gardening, H. L. Foster, Houghton

Mifflin, Boston, 1968.

Shrubs and Vines for American Gardens, Donald Wyman, Macmillan, NY, 1977. Your Lawn: How to Make It and Keep It, 2nd ed., R. Milton Carleton, Van Nostrand Reinhold, NY, 1971.

Also recommended:

Brooklyn Botanic Garden Handbooks Ortho Books Sunset Books

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WANTED

Iris laevigata

Contact: Mrs. Leon J. Heuser, P.O. Box 160, Robbinsville, NJ 08691

Lonicera alpigena 'Nana' (dwarf alps honeysuckle; Lonicera pileata (privet honeysuckle); Lonicera saccota; Lonicera spinosa 'Alberti' (Albertthorn honeysuckle); Lonicera thibetica (Tibet honeysuckle)

Contact: Frank D. Moyer, 409 Harleysville Pike, Souderton, PA 18964

Iris gracilipes; Helonias bullata (swamp pink or swamp hyacinth)

Contact: Mrs. Horace E. Godshall, Goezel Road, Box 516, Perkiomenville, PA 18074

Euphorbia myrsintes

Contact: Sir John R. H. Touron, K.B.E., Unionville, PA 19375 Seed of Houstonia caerulea (bluets, quaker ladies)

Contact: Elizabeth N. Hume, R.F.D. 1, Chester, VT 05143

Seed or seedlings of *Quercus macro-carpa* (bur oak)

Contact: Lee Fitchett, 5600 Knell Ave., Baltimore, MD 21206

To our readers: We've already gone to press for the July issue. Our normal lead time for publications is three months. We must have copy for the November issue by August 15.

classified ads

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